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The Effect of "Drought Tolerant" Plant Labeling on Consumers' Preferences and Willingness to Pay for Ornamental Plants

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THE EFFECT OF "DROUGHT TOLERANT" LABELING ON CONSUMERS' PREFERENCES AND WILLINGNESS TO PAY FOR ORNAMENTAL PLANTS

by

Susanne Tábara Cenador

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ABSTRACT

The Effect of "Drought Tolerant" Labeling on Consumers' Preferences and Willingness to Pay for Ornamental Plants

by

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Utah has the second-lowest annual precipitation and the second-highest water consumption per capita in the US (Milligan, 2019; NIDIS, 2019). Landscaping constitutes 60% of residential water use and is, therefore, a target of education programs in the effort to promote water conservancy (Klotz, 2019). The water-wise "Yellow Tag" program developed by the Utah Division of Water Resources seeks to provide retail nurseries with free tags for labeling plants which are considered low water use with the objective of promoting water conservation. The objective of this study is to determine the effect of the *Yellow Tag* water-wise labeling on consumer preference (CP) and willingness to pay (WTP) for ornamental plants.

Consumer preference and willingness to pay are evaluated using an asymmetric choice experiment, with two plant alternatives, daylilies (*Hemerocallis spp.*) and spiderwort (*Tradescantia virginiana*), and a neither option. The attributes examined in the choice alternatives are flower color, irrigation need, production location and price. The asymmetric design of the choice experiment allows effective evaluation of the drought tolerant (DT) attribute when consumers face the choice of both types of plants. The data for this study was collected through an online survey instrument applied to 463 participants residing in the state of Utah.

The results indicate that consumers are willing to pay a premium of up to $0.85 for daylilies labeled with the *Yellow Tag* and require a discount of up to $1.79 for spiderwort labeled *Frequent Irrigation Need*. The flower color and production location were not statistically significant. Significant marginal premiums for the *Yellow Tag* were also found for respondents who are female, living in single houses, are concerned about the price of water and are drought aware. These promising results may encourage Utah governmental and education agencies to continue the Water-Wise program, expand educational programs to increase drought awareness and help retailers optimize their future product mixes.

(87 pages)

PUBLIC ABSTRACT

The Effect of “Drought Tolerant” Labeling on Consumers’ Preferences and Willingness to Pay for Ornamental Plants

Susanne Tábara Cenador

Utah’s water resources are endangered by low rainfall rates, high per capita water consumption and a strong projected increase of residents. The irrigation of ornamental plant landscaping is estimated to account for 60% of residential water use, and is, therefore, a target of education programs in the effort to promote water conservancy. The water-wise “Yellow Tag” program developed by the Utah Division of Water Resources seeks to provide retail nurseries with free tags for labeling plants which are considered low water use with the objective of promoting water conservation. The objective of this study is to determine consumer preferences for plants labeled with the *Yellow Tag*.

As a means of measuring consumer preference we use willingness-to-pay (WTP). We give participants the choice between daylily, spiderwort and neither. Choice alternatives differ in flower color, purported irrigation need, production location and price. The data for this study was collected through an online survey instrument applied to 463 participants residing in the state of Utah.

Our results show that consumers prefer daylilies labeled with the *Yellow Tag*, and dislike spiderwort labeled with a high irrigation need. Special preference for *Yellow Tag* labeled ornamentals was found for respondents who are female, living in single houses, are concerned about the price of water and are drought aware. We do not find a preference for flower color or production location. These promising results may encourage Utah governmental and education agencies to continue the Water-Wise program, expand educational programs to increase drought awareness and help retailers optimize their future product mixes.

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Susanne Tábara Cenador

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1.1 Importance of Water Conservation in Utah and the US

According to the US government, the entire state of Utah is regularly affected by drought (NIDIS, 2019). Figure 1 shows that in 2018, up to 90% of the area of Utah was affected by at least severe drought. When looking at the larger scale, the whole Western US is suffering from varying degrees of drought, especially in the Four Corners area, where the borders of Utah, Colorado, Arizona and New Mexico meet.

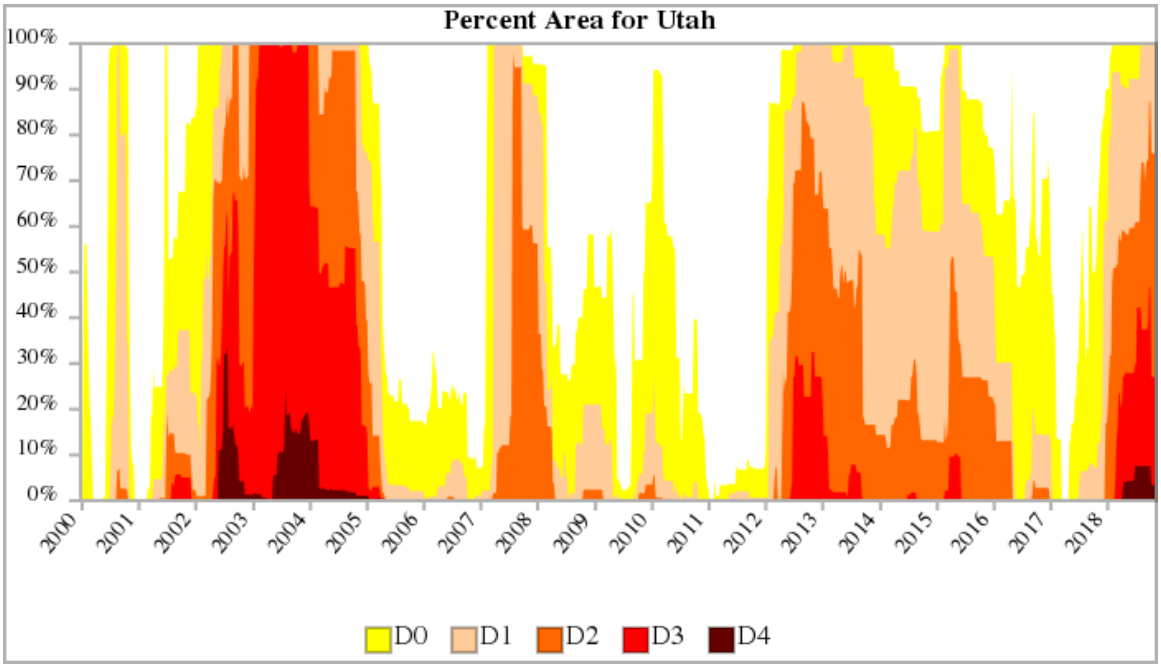
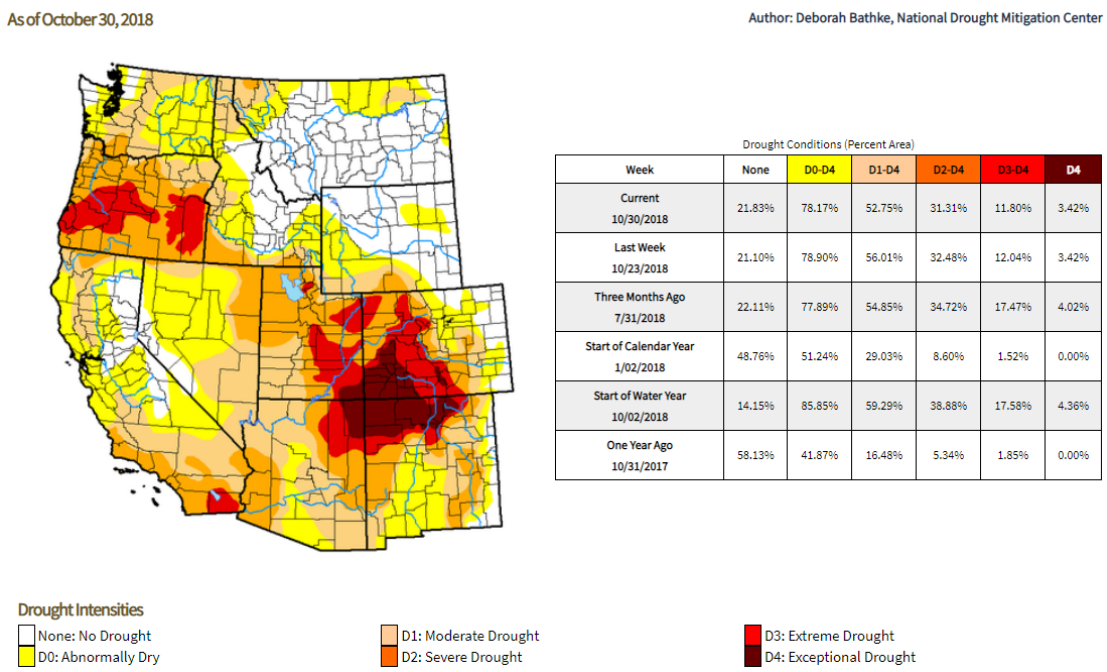


Figure 1. Drought affected areas in Utah. D0 = Abnormally dry, D1 = Moderate drought, D2 = Severe drought, D3 = Extreme drought, D4 = Exceptional drought. (Source: www.drought.gov)



Drought Conditions (Percent Area)

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current 10/30/2018	21.83%	78.17%	52.75%	31.31%	11.80%	3.42%
Last Week 10/23/2018	21.10%	78.90%	56.01%	32.48%	12.04%	3.42%
Three Months Ago 7/31/2018	22.11%	77.89%	54.85%	34.72%	17.47%	4.02%
Start of Calendar Year 1/02/2018	48.76%	51.24%	29.03%	8.60%	1.52%	0.00%
Start of Water Year 10/02/2018	14.15%	85.85%	59.29%	38.88%	17.58%	4.36%
One Year Ago 10/31/2017	58.13%	41.87%	16.48%	5.34%	1.85%	0.00%

Figure 2. Drought conditions in the Western US

On the other hand, Utah is one of the US states with the highest per capita water consumption, with most of residential water consumption being used for irrigation of lawns and gardens (Klotz, 2019). The Gardner Institute projects Utah's population to nearly double by 2065, from 3 million residents in 2015 to 5.8 million in 2065 (Gardner Policy Institute, 2019). Consequently, we may expect overall water consumption to rapidly increase in Utah, unless counter measures are taken. Taking these factors into account, water conservation is an important task now and in the future.

1.2 The Water-Wise program

The Water-Wise program was funded in January 2003 by several governmental and local organizations, such as the Utah Division of Water Resources and the Central Utah Water Conservancy District, among others. It is cooperating with agencies, such as Utah State University (USU) Extension, the USU Center for Water Efficient Landscaping, the Utah Nursery and Landscape Association and Salt Lake City Corporation, as well as educational gardens, e.g. Utah State University Botanical Center, Red Butte Garden and Arboretum and Wasatch Community Gardens (Heflebower, Cerny-Koenig, Waters & Ward, 2005). The program organized a list of water-wise plants. To be considered water-wise, plants must meet the following criteria: adapted to Utah's arid climate and cold winters, available in the industry, relatively easy to maintain in the landscape, and have characteristics which remain desirable under limited water availability. To indicate to customers which plants fulfil these criteria, the Water-Wise program developed the so-called *Yellow Tag*. The Yellow Tag is a yellow plastic label, which can be attached to retail ornamental plants and is available to participating nurseries across Utah (see Figure 3). The label is shaped like the state Utah, and sports the logo of *Slow The Flow*, the consumer education department of the Utah Division of Water Resources, as well as the rendering of a plant and the inscription "Water-Wise Plant" (Klotz, 2019).

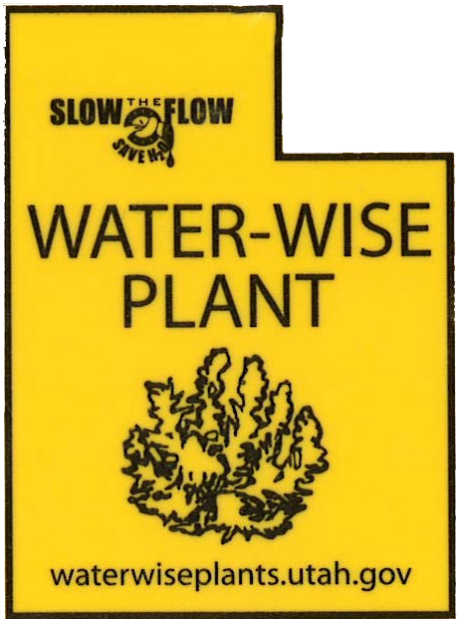


Figure 3. Water-Wise Yellow Tag, indicating that the labeled plant is drought tolerant and needs only minimal irrigation

A small, initial study regarding consumer awareness of the Yellow Tag was conducted at the end of the first season after the introduction of the label, and indicated favorable results (Heflebower et al., 2005). Since the introduction of the program, more than 15 years have passed. It is therefore of high economic interest to the nursery industry, as well as to water conservation agencies and research institutions, to evaluate whether consumers are interested in purchasing plants labeled with the Yellow Tag, and whether they are willing to pay premiums for such labeled plants. Therefore, we developed a survey which captures consumer preference (CP) and attitude regarding ornamental plants and retailers, as well as a choice experiment designed to estimate preference and willingness to pay (WTP) for certain plant attributes, with special attention to irrigation need. Additionally, we evaluate whether there are generational

differences in preference and WTP, to better identify and address customer segments. This approach is motivated by the findings, that there are significant generational differences in attitude regarding environmental amenities and economic paybacks (Alsop, 2008; Arnett, 2013; Collart, Palma, & Hall, 2010; do Paço, Alves, Shiel, & Filho, 2013; Furlow & Knott, 2009; Hall & Dickson, 2011; Heo & Muralidharan, 2017; Howe & Strauss, 2007; Jackson, Stoel, & Brantley, 2011; Parment, 2013; Smith & Brower, 2012; Smith, 2010; Twenge, Campbell, Hoffman, & Lance, 2010; Twenge, Campbell, & Freeman, 2012; Wong, Gardiner, Lang, & Coulon, 2008).

Depending on our results, nurseries may adjust their product range to gain economic benefit. In the case that consumers are willing to pay premiums for plants labeled with the Yellow Tag, more nurseries may be willing to adopt the program, as it promises economic benefits. On the other hand, we may also find that consumers, when comparing plants with the Yellow Tag to those with a high irrigation need, require discounts for plants with a high irrigation need. In this case, nurseries may change their product range in favor of plants with a low irrigation need to gain economic benefit. The results of our research may also influence the future development and sponsorship of retail and educational programs by water conservation agencies and educational institutions.

1.3 Objectives

While there is a growing body of literature regarding consumers' behavior towards and WTP for eco-friendly attributes of ornamental plants, no study has yet investigated

CP and WTP for the Yellow Tag by the Water-Wise program. Additionally, we find that there is a lack of research regarding consumers' attitude towards water-wise plants, particularly in the arid Rocky Mountain Region. Our study seeks to fill this gap by examining Utah residents' CP and WTP for ornamental plants labeled as drought-tolerant. The objectives of this study are the following:

1. Analyze Utah consumers' preferences and attitudes when shopping for ornamental plants.
2. Determine the effect of the "Yellow Tag" program on CP and WTP for ornamental plants.
3. Calculate consumers' WTP for different ornamental plant attributes including irrigation need, origin or production location, and aesthetic attributes such as flower color.
4. Examine generational differences in interest towards ornamental plants labeled with the Yellow Tag.
5. Identify key consumer segments and their socio-demographic characteristics.

To accomplish the objectives of this study we designed an online consumer survey, which was administered to Utah households. The survey is composed of the following three segments: 1) socio-demographic factors, 2) preference and attitude regarding ornamental plants, retailers of ornamental plants and environmental issues and 3) a choice experiment.

The WTP for plant irrigation need and other plant attributes are estimated from survey data. Additionally, model interactions with socio-demographic variables are used to help

identify market segments. The two plants used in the choice experiment, daylilies and spiderwort, were represented as perennial plants with low and high irrigation need, respectively. Daylilies (*Hemerocallis ssp.*) are designated as water-wise and suggested for landscaping in Utah (Cerny, Sagers, & Bitner, 2003). They are popular because of their colorful flowers, low maintenance requirements and high climate and soil adaptability (Allen, 2009).

We analyze WTP to capture whether consumers have a preference, expressed in the WTP a premium for one choice over the other. While the examination of consumer preferences and shopping habits will yield important information for the nursery industry, the study of environmental attitudes may shine a light on socio-demographic groups who could benefit from targeted education programs towards water conservation.

1.4 Organization of the Thesis

This thesis is organized into six chapters. In Chapter 2 we discuss the existing literature regarding CP and attitude on ornamental plants, retailers of ornamental plants and environmental issues, as well as generational differences in attitude regarding environmental amenities and economic paybacks. Next, Chapter 3 describes the survey outline and application method, presents our data cleaning approach and tabulates the summary statistics regarding the survey demographics, in comparison to the Utah Census 2016. The theory behind the multinomial logit models used to estimate utility and WTP coefficients is laid out in Chapter 4. In Chapter 5, we first discuss the results of the analysis of the respondents' preference and attitude towards ornamental plants, retailers

of ornamental plants and environmental issues, followed by the presentation and discussion of the results of the choice experiment. Lastly, in Chapter 6 we discuss the conclusions of the study and their possible implications on the nursery industry, water conservation agencies and educational and research institutions.

CHAPTER 2 - LITERATURE REVIEW

Green industry products and services are associated with many benefits for consumers. Studies indicate that flowers generate happiness, and gardening reduces stress and gives individuals an opportunity to channel frustration (Hall & Dickson, 2011). But the market for ornamental plants has grown hypercompetitive as customer demand is maturing (Collart et al., 2010). Even though the green industry has largely recovered after the recession of 2008/2009, firms must generate profitable marketing strategies to sell their products. The increase in quality of life that comes with gardening and ornamental plants in general is a message worth sending to customers. Amidst concerns about environmental issues, firms are taking increasingly to strategies marketing their products as environmentally friendly to appeal to concerned consumers (Collart et al., 2010; D'Alessio, 2015; Hall & Dickson, 2011). Among the attributes most promoted are origin-certification, sustainability of production and organic production methods, as well as disease resistance and low input requirements. Most of the existing research on CP and WTP for ornamental plants labeled as eco-friendly focused on characteristics such as production method, production location and container type, as well as ornamental plants' status as native or invasive, or resistance towards pests or diseases of ornamental plants. But there are few relevant studies measuring consumers' willingness to pay (WTP) for drought tolerant (DT) ornamental plants, especially in drought-prone regions.

This literature review is structured into two sections. First, we discuss research on CP and WTP on plants labeled as eco-friendly, with special attention to studies conducted on DT of plants. In the following section we present literature on market segmentation, and

the special role generational differences can take in market segmentation, when considering environmental attributes.

2.1 CP and WTP for Eco-Friendly Labeled Plants

In drought-prone areas of the US, such as Nevada, California and Utah, high water prices may be a burden for homeowners. In previous research, both consumers who are affected by high water prices and consumers conscious to water shortages were found to be willing to reduce their landscape water use (Beal, Stewart, & Fielding, 2013; Hurd, 2006; Spinti, St. Hilaire, & VanLeeuwen, 2004). Some ways to reduce water consumption are the implementation of water conserving landscaping using native plants, the purchase of plants selected or bred for drought-tolerance (‘water-wise’ plants), the purchase of plants produced with water-saving methods (recycled water) and improved irrigation methods.

Research showed that an individuals’ water use is affected by the level of awareness of environment issues and the adoption rate of pro-environmental behavior (Beal et al., 2013; Knuth, Behe, Hall, Huddleston, & Fernandez, 2018; St. Hilaire et al., 2008). Knuth et al. (2018) analyzed whether consumers’ perception of drought and the actual state of drought they are living in coincide, and how a disconnection between the two may affect their preferences regarding water-saving production methods. They found that consumers with low drought awareness were less likely to choose water-conserving production methods.

One important indicator for CP and choice regarding the purchase of water-wise plants is, therefore, awareness of water shortages in the area where they are living. Other factors influencing water use are increased resale value of the house, esthetic and recreational priorities of homeowners, as well as social status (Beal et al., 2013; Fan, McCann, & Qin, 2017; Gregory & Di Leo, 2003; Syme, Shao, Po, & Campbell, 2004). Similarly, high awareness for other environmental issues may increase preference and WTP for related attributes. One study on brand awareness found that a higher shopping frequency, on average every one or two weeks, increased consumer awareness of brands for origin-certified ornamental plants. Higher brand awareness, in turn, increased customer satisfaction and preference for the brand, as well as WTP (Collart et al., 2010). Another study examined consumers' awareness regarding an ornamental plant disease, dogwood powdery mildew, and the WTP for plants resistant to the disease (Klingeman et al., 2004). The study showed that an increase in awareness of the disease, as well as a higher level of knowledge about integrated pest management methods, increased consumer preference for disease-resistant plants. Additionally, respondents were willing to pay significant premiums for such plants. Considering the impact consumer environmental awareness has on preference and WTP, the role of labeling to increase awareness has become a focus of attention for many researchers.

A significant amount of research has been devoted to examining consumer preference and WTP for plants labeled native/non-native and invasive/non-invasive (Curtis & Cowee, 2010; Helfand, Sik Park, Nassauer, & Kosek, 2006; Yue, Hurley, & Anderson, 2012, 2011). Helfand et al. (2006) investigated whether consumers are willing to pay premiums for yards designed using native plants, compared to turf grass lawns.

They found that the premiums customers are willing to pay significantly exceed the cost of implementation of such yards. Similarly, Yue, Hurley and Anderson (2011, 2012) showed that demographic, attitudinal and preference-related factors significantly influenced the size of the premiums and discounts. Based on attitudinal and preference-related factors, they segmented participants into *Nativists*, *Invasive-Averse* and *Typical Consumers*. These three subgroups were shown to have significantly different WTP. WTP is highest for plants labeled *Native and Non-Invasive*, for which premiums of up to $0.83 were estimated. For plants labeled "invasive", on the other hand, experiment participants required a discount of up to $1.89.

Other attributes of research interest are production method, origin certification and plant container type. Studies on roses, chrysanthemum and edible herbaceous plants indicate that consumers are willing to pay premiums for certain labels, such as organic production, local, regional and domestic origin, energy-saving production methods and non-plastic plant containers (Behe et al., 2010; Khachatryan, Campbell, et al., 2014; Khachatryan, Yue, Campbell, Behe, & Hall, 2014; Michaud, Llerena, & Joly, 2013; Rihn, Khachatryan, Campbell, Hall, & Behe, 2015, 2016). In many of these studies, socio-demographic factors, such as gender, age, relationship status, education and ethnicity significantly affected preference for eco-friendly labels (Behe et al., 2010; Khachatryan, Campbell, et al., 2014; Khachatryan, Yue, et al., 2014; Rihn et al., 2015, 2016). In a study focusing on participants' concern for future consequences (CFC), an attitudinal measure to determine an individual's level of concern about how actions today may affect the environment in future, researchers found that a high long-term CFC

correlated with a significantly higher WTP, compared to individuals with a high short-term CFC.

The literature on water-conserving plant attributes can be divided into literature focusing on water-conserving production methods, on the one hand, and DT plants, on the other hand. Khachatryan (2014a, 2014b) found that for plants with labels indicating water conserving production methods, consumers from the US and Canada were not willing to pay significant premiums. Knuth et al. (2018) reported that only consumers who perceived themselves as living in a region affected by drought exhibited significant WTP for water-conserving production methods, such as the use of recycled water in nursery production. Contrastingly, there is research which indicates that consumers are willing to pay premiums for water-efficient and water-conserving production methods (Cao, Bosch, & Pease, 2017; Hartter, Boyle, Pease, Moeltner, & Harris, 2012; Krovetz, 2016). Of special interest is the research by Krovetz (2016) which was conducted in California. This state is affected by drought, and California consumers may therefore be sensitized to the issue of water conservation. The results from Krovetz' survey show that California consumers are WTP significant premiums for produce which was produced in a water-efficient manner. Yue, Hugie and Wakins (2012) estimated consumers' WTP for low-input turf grass lawns. Attributes inherent to low-input in turf grass are low requirements for water, fertilizer and mowing. The study found that consumers exhibit a strong demand for turf grass with low input requirements. The survey participants were shown to be willing to pay significant premiums for reduced irrigation and mowing need. Finally, Fan, McCann and Qin (2017) examined demographics, preferences and attitudes of consumers who had adopted DT plants in their yard. They found that a high adoption

rate of DT plants was correlated with the time participants spent in their yard, as well as pro-environmental attitudes and their concerns regarding climate change. Fan, McCann and Qin also show that income affects adoption rate of DT plants: both low (<$25,000) and high (>$100,000) income categories were shown to have a significantly higher adoption rate, compared to income categories around the mean. The researchers assume that low income and high income increase the probability of adaption for differing reasons: Whereas consumers with a low income may want to cut their water bill to save costs, consumers with a high income may be more educated on drought situations and water-saving practices. These findings suggest that educational programs may help raise awareness of the importance of water-wise landscaping, especially in areas affected, or expected to be affected, by climate change and drought.

2.2 Generational Differences in Environmental Attitude

A growing body of literature has pointed out that individuals' preferences and attitudes may depend less on the year of birth, but rather on its generational cohort, and the environmental events which affected them when coming of age (do Paço et al., 2013; Howe & Strauss, 2007; Parment, 2013; Wong, Gardiner, Lang, & Coulon, 2006). Based on this, Howe and Strauss (2007) discussed that consumer behavior may not be forecasted linearly, but generational differences may allow predictions as to how generational behavior may develop. These attitudes and behaviors may mature over time, but will, on average, develop in a similar fashion for the whole generation. For this

reason, Parment (2013) suggested that a segmentation by generation, rather than by birth age, may provide a better approach for research on preference, behavior and attitude.

The literature indicates that there are significant differences in intrinsic and extrinsic values, behavior and environmental attitude between generations (Alsop, 2008; Arnett, 2013; Howe & Strauss, 2007; Twenge et al., 2010, 2012). Parment (2013) reported that Baby Boomers, the generation born between 1946 and 1964, place a higher value on retail experience and in-store service than Generation X and Millennials, born 1965-1983 and 1984-1999, respectively. They explained that Baby Boomers start their purchasing process by finding a retailer which they trust. Younger generations, on the other hand, are reported to be less loyal to retailers. For them, the purchasing process starts by choosing the product itself. Twenge, Freeman and Campbell (2009) conducted longitudinal surveys on young adults and found that civic orientation, associated with political and environmental engagement, declined in Generation X and Millennials, compared to Baby Boomers. The decline in actions to help the environment was steepest within Generation X, and slowed, but not reversed, for the generation of the Millennials. Several other studies support these findings (Alsop, 2008; Heo & Muralidharan, 2017; Twenge et al., 2010). But there are is also evidence for a growing eco-consciousness among Millennials, expressed in preference for eco-friendly products and social responsibility (Alsop, 2008; Arnett, 2013; Furlow & Knott, 2009; Heo & Muralidharan, 2017; Smith & Brower, 2012; Smith, 2010).

While Baby Boomers have long been the primary target for green products among consumer groups, this generation is ageing and shrinking. Millennials are the next largest

generation, and have recently begun to show increasing spending power, which makes them attractive targets for marketing campaigns. Millennials are estimated to have a market spending power worth $200 billion (Tilford, 2018). While older Millennials are already part of the workforce, younger Millennials still influence family purchase decisions, and are expected to soon turn into lucrative consumers. These factors make Millennials a high priority target for marketers and market research, alike (Heo & Muralidharan, 2017). Recent studies have been focusing on Millennials' preferences and attitudes regarding environmentally beneficial attributes and eco-friendly labeling when making purchasing behaviors. Eco-friendly labels were shown to be widely regarded as favorable by Millennials (Furlow & Knott, 2009; Heo & Muralidharan, 2017; Smith, 2014; Smith & Brower, 2012). But Millennials were also found to be uncertain regarding the growing "green" terminology (Smith, 2014; Smith, 2010). The labels most strongly identified with an eco-friendly message were "Eco-friendly", "Recycled" and "Green". Smith and Bower (2012) also found, that Millennials navigated products by searching for specific symbols, such as the green recycling point. Taking all of these findings into account, we consider it justified to take a closer look at different generations' attitude towards ornamental plant labeling.

CHAPTER 3 - DATA

3.1 Survey Development and Description of Parts

The survey was comprised of three parts: socio-demographic characteristics, CP and purchasing behavior, and choice experiment. Three initial screening questions asked whether participants were over the age of 18 years, residents of Utah, and whether they were responsible for their household's ornamental plants and landscaping materials shopping. Respondents proceeded to the following sections if they answered 'Yes' to the first two questions, and 'All or most of it' or 'About half of it' to the third screening question. In this way we guaranteed that survey participants fit the scope of our research. Demographic information of the survey participants was collected to establish whether the survey sample is representative of the Utah population, and to use it for analysis of the choice experiment. We examined CP and purchasing behavior, as it can influence decision making. This information was then used to analyze whether we can find correlations and patterns between consumer attitude and behavior, and the decisions they made in the choice experiment.

The demographic data collected included gender, age, race, annual household income, marital status, education level, type of housing, and number of adults and children per household. The categories used to build demographic questions were kept as close as possible to the Utah census to facilitate comparability.

The section on CP and behavior is comprised of 13 questions, which we can roughly divide into two categories: Shopping attitude and preferences, and environmental attitude. The findings of the first category can be of direct importance to nurseries and

retailers, as it helps them address consumer needs and marketing strategies for Utah consumers. The latter category helps researchers, producers and retailers alike, to determine whether there is a relationship between Utah consumers' environmental attitudes and the demand and WTP for eco-friendly labeled plants, especially with respect to drought tolerance. Marketing strategies and information campaigns based on these findings are likely more effective and efficient, serving the purpose of all parties involved.

In the first category, we asked for participants' shopping behavior and ornamental plant preferences. For example, we asked them to state the importance they place on certain attributes of ornamental plants, such as appearance, drought tolerance, price or size. Additionally, we asked our respondents to judge their level of expertise in home gardening, based on a 5-point scale from 'Novice' (lowest level) to 'Expert' (highest level). In the section on environmental attitude.

In the section on environmental attitudes and preferences, we investigate into respondents' attitude regarding plant labels, regionality, environmental issues and water price and conservation. On plant labels, for example, we asked our respondents to state whether they have ever bought local, native, drought tolerant or exotic plants. Regarding water price, we asked the respondents about their level of concern regarding water price in general, and when making landscaping decisions.

The final section of the survey is the choice experiment. Respondents are given sets of choices, in our case ornamental plants, with different attributes. According to consumer theory (Lancaster, 1966), each respondent will pick the choice, or bundle of attributes that maximizes their utility within the choice situation. Before the choice

experiment task, we explain to the respondents that they should make their choice as if it was a real-life shopping situation. In hypothetical choice situations, consumers may act less price sensitive than they would do in a real-life shopping situation, which would bias the utility and WTP estimations. Additionally, we give them information about the attributes and levels used in the following experiment section, and we familiarize them with the yellow 'Water-wise' label, which indicates drought tolerant plants (see Figure 3).

The choice experiment contained of 18 choice sets in total, of which each included three alternatives: two plant options, daylilies and spiderwort, and a neither option. Daylilies and spiderwort were originally selected due to their very similar appearance but supposed inherently different watering needs. Further review indicates that they both are moderately drought tolerant. Therefore, in this study, the critical issue is the labeling, not the inherent drought tolerance of the plants. The different choices in our experiment were based on four attributes: Flower color, labeled irrigation need, production location and price. Each attribute could take multiple levels. The attribute levels for flower color and irrigation need label were designed asymmetrically, meaning that daylilies and spiderwort had differing levels. Flower color could take the levels 'yellow' and 'orange' for daylilies, and 'pink' or 'purple' for spiderwort. These colors were picked as they represent the most widespread colors for both daylilies and spiderwort.

Irrigation need could take the levels *Minimal Irrigation Need* or *Yellow Tag* (drought tolerant) for daylilies, and *Frequent Irrigation Need* or *No Claim* for spiderwort. The labels applied indicate differing irrigation needs, which is reflected in the levels

chosen. As labeled, daylilies are represented as not needing frequent irrigation, whereas spiderwort is represented as not drought tolerant and needing frequent irrigation. The possible levels for production location were ‘Grown in Utah’, ‘Grown in the Western US’ and ‘no claim’. The price levels used were $5.99, $7.99 or $9.99. These price levels reflect realistic retail prices for both daylilies and spiderwort. With the given attributes and levels, a total of 36 combinations were possible for each plant type, which gave us a full factorial of 1296. We selected a total number of 18 choice sets, using a fractional factorial design, which allowed us to estimate the utility for each attribute with a reduced number of choice sets. These 18 choice sets were split into two blocks of nine sets each, blocks A and B, and respondents were assigned to one of the two blocks at random. Each single choice set included three answer options: daylily, spiderwort or neither, as depicted in Figure 4 below. Additionally, each choice set offered the option to display an explanation of the used attribute levels.

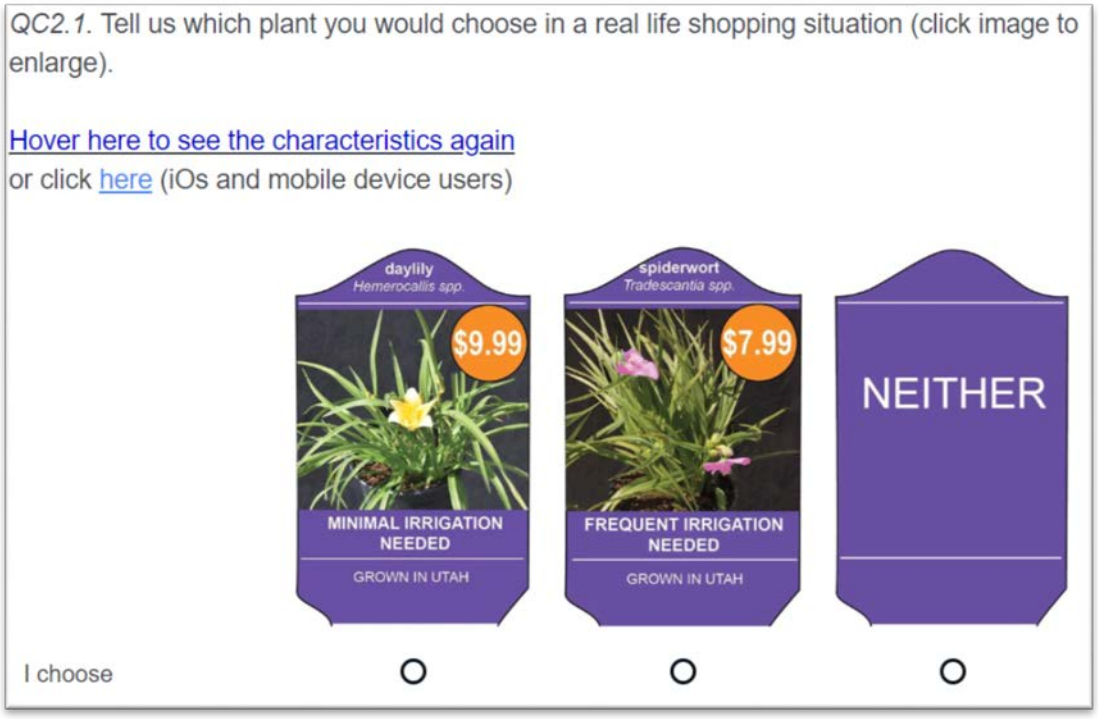


Figure 4. Example of a choice set. The answer options are either 'daylily', 'spiderwort', or 'neither'

3.2 Survey Application

Prior to the survey application, we conducted one round of pre-testing. The survey was sent out to 20 students and university faculty members. The participants were instructed to record their response time and to point out any misleading questions, spelling errors and provide feedback. The pre-test yielded 14 completed responses, which were used to eliminate spelling errors, clarify ambiguous questions and improve user-friendliness of the survey design (i.e., question layout, progress bar, image size, etc.). The average response time throughout the pre-test was 15 minutes. The survey design, which initially laid-out drop-down menus, was changed to a matrix style. Matrix style questions increase user-friendliness, as respondents can make choices more intuitively on the grid

frame. Another finding of the pre-test was that several respondents testified that they would not have bought any of the plant options given in the choice experiment in a real-life shopping situation due to their negative predisposition towards daylilies and spiderwort. As the preference for ornamental plants may be very subjective, we cannot address this concern in our survey design by means of changing to another plant. Nevertheless, we must account for this circumstance when interpreting the results of our choice experiment.

The final survey application was conducted by Qualtrics, an online survey software (Qualtrics, LLC, Provo, UT). The survey launched in two waves. A soft launch was performed before the full launch of the survey. Qualtrics uses the soft launch approach to determine average response-time and cut-off times. Besides our built-in screener questions, Qualtrics used a regiment of quotas to fulfill specific customer needs. In our case, quotas were established so that our sample can be as close to Utah demographics as possible. Additionally, a quota was in place to send out and receive the same amount of choice sets A and B. The roll-out of the full launch was timed to take place in spring; this is the time of the year when most people purchase ornamental plants and landscaping materials. Therefore, respondents are more likely to have had recent contact with real-life shopping experiences and information about ornamental plants. The soft launch was started on May 14, 2018 and finished May 15, 2018. After reviewing the soft launch raw data, the full launch was started on May 16, 2018 and finalized on May 23, 2018. Only surveys conforming to the initially set quotas and time limitations were marked as completed and valid by Qualtrics.

3.3 Total Number of Responses and Cleaning Procedure

Following the full launch, we collected 471 completed responses. [1] After the collection of the raw data was finished, a data cleaning procedure was established to exclude invalid responses from further analysis. All responses below five minutes were marked as suspicious. We adopted the same strategy as Qualtrics and set the lower time limit at one third of the average response time, which was 15 minutes based on our pre-test results. The further data cleaning procedure was based on several exclusion factors: response time below 5 minutes, patterns or straight lining or all "neither" during the choice experiment, and ambiguous answers were marked as suspicious. Only a combination of these criteria led to the exclusion of a response (e.g., a response time below five minutes plus a recognizable pattern or straight lining in the questions on consumer behavior).

Patterns or straight lining are a common sign of respondents answering as quick as possible to reduce the time and effort needed to complete a survey; these responses are therefore often not truthful or well thought-through. In addition, straight lining or patterns may be better indicator of a rushing respondent, as every participant may have a different speed of reading.

A total of 11 respondents opted out of buying any of the two plants presented in the choice experiment. This may be, on the one hand, interpreted as straight lining with the respondent rushing through the experiment part. On the other hand, it is also possible

[1] The survey service Qualtrics automatically excluded responses below 230 seconds total response time. This threshold was calculated from the average soft launch response time of 690 seconds. Qualtrics argues that any response below one third of the average soft launch response time can be deemed invalid.

that those respondents disliked both plant choices so much that they would not buy them in a real-life shopping situation. This may be true at least for a subset of respondents, considering the feedback we received in the pre-test of the survey. Therefore, no surveys with straight-lining in the choice experiment were accepted.

In total, eight responses were excluded, leaving 463 responses for further analysis. Out of these eight responses, seven were excluded for a combination of straight lining and time below our internal lower threshold. The last exclusion was made because of an illogical answer; the respondent claimed to live in a household with ten adults and ten children. As this answer was not credible to us, the complete response was excluded from further analysis.

3.4 Summary Statistics of Demographics

The demographic data of the survey responses were compared to the Utah census from 2010 and a more recent estimation made by the Census Bureau based on the years 2012-2016 (United States Census Bureau, 2019). Table 1 shows the summary statistics of the survey demographics. In our sample 83.4% of the respondents are female and 16.6% male. This gender ratio in our sample is significantly different from the census, which lists 50.3 percent of the population aged 18 years and older as female, and 49.7 percent as male.[2] There are several explanations for the abundance of female respondents in our survey. Most likely, women are more involved in landscaping and ornamental plant

[2] Statistical differences between means were determined using two-sample t-test at the 0.05 significance level.

purchasing decisions. Respondents who do not purchase ornamental plants were automatically excluded from further survey participation. The disproportion of gender in the response needs to be kept in mind when interpreting the survey data. On average, respondents fall in the 25 to 34 years category. This matches the mean age of Utah residents of 30.3 years. For most of the age categories, the survey population did not differ significantly from the Utah population. Two exceptions are the categories 18-24 and 35-44 years. The category 18-24 years was underrepresented, with a proportion of 12.7 percent versus 16.7 percent in the census. The category 35-44 years, on the other hand, was over-represented with a proportion of 22.8 percent compared to 17.6 percent in the Utah population. One explanation for the under-representation of the youngest age category in our survey may be that many Utah residents at this age are not yet homeowners, and therefore do not make gardening purchases. More than two thirds of our survey respondents indicated they were married, whereas the overall marital rate in Utah is at 56%. This, again, is likely caused by the pre-selection of respondents who buy ornamental plants, and who are therefore more likely to live with family members or in houses.

In its statistics on race, the US Census Bureau differentiates between one race and multiple races, as well as between Hispanic/Latino and Non-Hispanic/Non-Latino ethnicity. Our survey respondents predominantly identified as having one race and being White or of Caucasian descent. While overall being comparable to the Utah Census 2016, we find that our sample is slightly underrepresenting Latinos and Hispanics.

To summarize, the respondents in our sample are predominantly female, aged 25-34, married and white. Compared to the Utah Census 2016, our survey respondents have

a slightly more racially diverse background, but Latinos and Hispanics are underrepresented.

Table 1. Summary statistics of respondents' gender, age, marital status and race

Characteristic	Survey		Utah Census 2016
	n	% Frequency	% Frequency
Total responses	463	100	100
Gender			
Male	77	16.6	50.3
Female	386	83.4	49.7
Age			
18-24	59	12.7 *	16.7
25-34	114	24.6	23.6
35-44	105	22.7 **	17.6
45-54	64	13.8	16.2
55-64	56	12.1	12.7
65+	65	14.0	13.2
Total responses	463	100	100
Marital status			
Single	112	24.2	-
Married	316	68.2 ***	56.0
Other	35	7.6	-
Ethnicity			
Hispanic or Latino	17	3.7 ***	13.0
Not Hispanic or Latino	446	96.3 ***	87.0
Race, One	440	95.0 **	97.3
American Indian or Alaska Native	5	1.1	1.2
Asian	13	2.8	2.0
Black or African American	1	0.2	1.1
Native Hawaiian or Pacific Islander	3	0.7	0.9
White or Caucasian	399	86.2	86.1
Other	2	0.4 ***	6.0
Two or more races	23	5.0 **	2.7

Note: Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*).

Table 2 summarizes data with respect to highest achieved level of education and annual household income. Most respondents in our survey have a college degree, with the largest group having earned a Bachelor's Degree. When comparing education levels between survey sample and Utah Census, we found significant differences. Whereas the levels of "High School" and "Some college" were underrepresented throughout the survey respondents, higher levels of education, such as "Associate's", "Bachelor's" and "Graduate/Professional" degrees were over-represented. In general, our sample respondents have an education above the census average.

We found that 7.6% of respondents state to have an annual household income above $100,000. The median income category found for the respondents of our survey is the category of $40,000-59,999. According to the Census Bureau's estimates, the median income in Utah in 2016 was $62,518, while the estimated mean income is $79,414. Compared to the Census Bureau's estimate, our sample exhibits a significantly larger share of respondents with an annual household income below $10,000, as well as a lower share in the income categories above $100,000. Overall, our survey participants' income appears to be below the census data. Overrepresentation of below-average income population may be explained by the attractiveness of survey incentives, such as rewards for survey completion, to those with a lower income.

In summary, our survey participants have a higher level of education, but a lower level of income, compared to the Utah Census. We will need to keep these facts in mind when interpreting results. We may expect a higher than average price sensitivity, level of expertise and drought awareness.

Table 2. Summary statistics of respondents' income and education

Characteristic	Survey		Utah Census 2016
	n	% Frequency	%Frequency
Education			
No High School Diploma	5	1.1 ***	9.2
High School Diploma	63	13.6 ***	24.2
Attended College, no Degree earned	121	26.1 *	31.0
Associates Degree	59	12.7 ***	8.1
Bachelor's Degree	159	34.3 ***	18.7
Graduate or Advanced Degree	53	11.5 *	8.9
Other	3	0.7	0.0
Annual Household Income[3]			
<$10,000	36	7.8 ***	4.7
$10,000 - $19,999	98	21.2	
$20,000 - $39,999	118	25.5	
$40,000 - $59,999	87	18.8	
$60,000 - $79,999	60	13.0	
$80,000 - $99,999	29	6.3	
≥$100,00	35	7.6 ***	25.3
$100,000 - $119,999	16	3.5	
$120,000 - $139,999	11	2.4	
$140,000 - $159,999	2	0.4	
>$160,000	6	1.3	

Note: Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*).

Table 3 summarizes our survey sample's household size and type of housing. The most common household size is two (35.5%), followed by four (18.4%) and three

[3] Income categories used in the sample are not the same as in the Utah Census; comparability is therefore limited.

(13.6%) persons. The least common household size is one person. These numbers indicate that our respondents typically live in families. When compared to the Utah Census, our survey sample has fewer single households, but significantly higher proportions of 2-person and 4-person households. Most of our survey respondents live in a single-family house, followed by apartments. When comparing these results to the Utah Census, we find that single family houses are overrepresented in our sample, and apartments underrepresented. This makes sense, as people living in houses usually have a garden and purchase ornamental plants, whereas this is not necessarily true for people living in apartments. Apartment dweller remained included in the survey, as they may have previously lived in houses with gardens. In summary, our survey sample consists mostly of families living in single houses.

Table 3. Summary statistics of respondents' type of housing and household size

Characteristic	Survey		Utah Census 2016
	n	% Frequency	% Frequency
Household size			
1	46	10.0 ***	18.7
2	162	35.0 **	29.3
3	63	13.6	16.0
4	85	18.4 *	15.1
5	53	11.5	10.3
6+	54	11.7	10.7
Type of House			
Single Family House	347	75.0 *	70.3
Town Home	35	7.6	6.1
Apartment	69	14.9 **	20.5
Other	12	2.6	3.1

Note: Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*).

Overall, our survey population is sufficiently representative of Utah's population. Where it differs from the Utah Census, this can be mostly explained by the characteristics of our survey. Women and married persons are more likely to oversee ornamental plant purchases. A higher education level and lower income make online surveys more attractive, and families living in single houses are more likely to have a yard, for which they purchase ornamental plants. Since these characteristics also describe the most lucrative customer segment for nurseries, we accept the divergences from the Utah Census, but may not be able to extrapolate our findings to other customer and population segments.

CHAPTER 4 - METHODS

The basis of our research is the utility theory, which defines that in any given choice situation consumers prefer the good which maximizes their utility (McFadden, 1981; Thurstone, 1994)(Thurstone, 1927; McFadden 1981). According to Lancaster's new consumer theory (1966) each good can be described as a bundle of attributes. As explained by Train (2002), the utility decision maker *n* obtains from choosing choice *j*, from a set of *J* alternatives, can be described as the sum of the systematic components of the choice, V_{nj}, and the random component, ε_{nj}.

(1) $$U_{nj} = V_{nj} + \varepsilon_{nj}$$

The systematic component is a vector of attributes of choice *j*, denoted as x_j, as well as individual-specific characteristics, denoted as s_n, which are constant for the *n*th decision maker across all choice sets (for example income or age).

(2) $$V_{nj} = V(x_j, s_n)$$

Logit probabilities and utility levels cannot be used to express consumers' preference in absolute values, but to examine their relative magnitude. To obtain a meaningful measure we calculate the WTP. To estimate the sample population's WTP for an attribute, with respect to price, using the following equation:

(3) $$WTP = -\left[\frac{\beta_m}{\rho}\right]$$

where β_m and ρ are the utility estimates for parameter m and price, respectively.

When introducing socio-demographic or attitudinal interaction terms, the calculation changes as indicated in the following example,

(4) $$WTP_{Age1} = -\left[\frac{\beta_m + \beta_m . Age1}{\rho + \rho . Age1}\right]$$

where $\beta_m . Age1$ is the coefficient of the interaction term of attribute β_m with age group 1, and $\rho . Age1$ is the coefficient of the interaction term of price with age group 1. A positive, significant WTP coefficient is interpreted as an individual's or a population's WTP a premium for the examined attribute. A negative, significant WTP, on the other hand, means that the individual or population requires a discount on the price of the product, due to a negative perception of the examined attribute.

CHAPTER 5 - RESULTS

5.1 Shopping Behavior and Preferences

The following analysis was conducted on the whole sample (n=463), as well as on subsets, which were selected by age groups to reflect possible generational differences in CP and behavior. The generations selected are Baby Boomers aged 55 years and older (n=121), Generation X aged 35 to 54 years (n=169), and Millennials aged 18 to 34 years (n=173). Statistical significance is indicated for Generation X and Millennials compared to Baby Boomers (base), computed via two-sided t-test with confidence levels of 0.001 (***), 0.01 (**), 0.05 (*) and 0.1 (.).

We start by examining the stated level of expertise in gardening among our survey respondents. This survey item connects the sections on socio-demographic characteristics and behavior and preferences. The mean level of expertise for the whole sample, reported in tables 4 and 18 (Appendix B), is 2.44, which indicates an average competency. When comparing the generational subsets, we see that Baby Boomers have stated the highest mean level of expertise. Millennials' level of expertise is significantly lower than that of Baby Boomers. This is likely to be due to an overall longer experience in gardening of Baby Boomers.

Table 4. Mean stated level of experience in gardening and comparison of generational subsets

	Whole sample	Baby Boomers	Generation X	Millennials
Mean level of expertise	2.44	2.55	2.50	2.31 *
	(0.97)	(0.93)	(1.00)	(0.94)

Note: Scale used is 1=”Novice”, 2=”Some experience”, 3=”Competent”, 4=”Proficient”, 5=”Expert”.

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parenthesis.

We continue with the analysis of how frequently respondents purchase gardening materials and tools. Table 5 displays the mean purchasing frequency for different categories of plants and material among our survey respondents; a more detailed summary of the reported frequencies can be found in Appendix C. In the sample average, annual plants are bought once a year or more frequently. Most other plants and materials were also reported to be bought mainly annually, i.e. perennial flowers and grasses, tools and fertilizer or pesticides. Ornamental trees and shrubs, on average, are bought every two years.

When comparing the purchasing frequency of gardening tools among the three presented generations, Baby Boomers show an average purchasing frequency below those of Generation X and Millennials. A likely explanation is that this generation already has acquired most of the gardening tools it requires, and only needs to make purchases when tools break or to upgrade to better models.

Table 5. Mean frequency of gardening material purchases

	Whole Sample	Baby Boomers	Generation X	Millennials

Annual flowers, vegetables, seeds	2.58	2.63	2.51	2.62
	(0.91)	(0.77)	(0.84)	(1.05)
Perennial flowers, ornamental grasses	2.83	2.87	2.78	2.84
	(1.03)	(1.03)	(0.93)	(1.12)
Ornamental trees and shrubs	3.58	3.70	3.56	3.52
	(0.97)	(1.02)	(0.95)	(0.96)
Fertilizer, pesticide or soil amendments	2.42	2.47	2.30	2.51
	(1.00)	(0.84)	(1.00)	(1.09)
Gardening, landscaping tools	2.99	3.23	2.90 **	2.91 **
	(0.99)	(0.98)	(0.89)	(1.06)

Note: The scale used is 1="Once every three months", 2="Twice a year", 3="Once a year", 4="Every two years", 5="Never".
Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). standard deviation in parentheses.

Table 6 summarizes how much money the survey respondents spent on gardening supplies in the last year. On average, the survey respondents spent $187 in the last year on ornamental plants. The mean and median are $187 and $145, respectively, and are relatively close to each other. The expenditure range ($8 - $937) shows a wide spread between how much respondents spend annually. When visualizing the data on annual spending (Figure 5), we can see that the maximum value, and several other high values, are outliers, relative to most of the respondents' spending. Respondents from Generation X reported a higher mean annual spending for ornamental plants compared to Baby Boomers and Millennials. We expect that the gardens of Baby Boomers are more mature than those of Generation X respondents and may require fewer new plant material. A significant share of Millennials, on the other hand, may not be home owner yet, which leads to an average annual spending below that of Generation X.

Table 6. Average annual spending on landscaping materials in US$.

$ spent /year	**Whole sample**	**Baby Boomers**	**Generation X**	**Millennials**
Minimum	8	11	8	10

Median	145	135	159	135
Mean	187.0	164.7	205.6 **	184.3
	(148.5)	(130.3)	(158.8)	(148.5)
Maximum	937	937	797	800

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

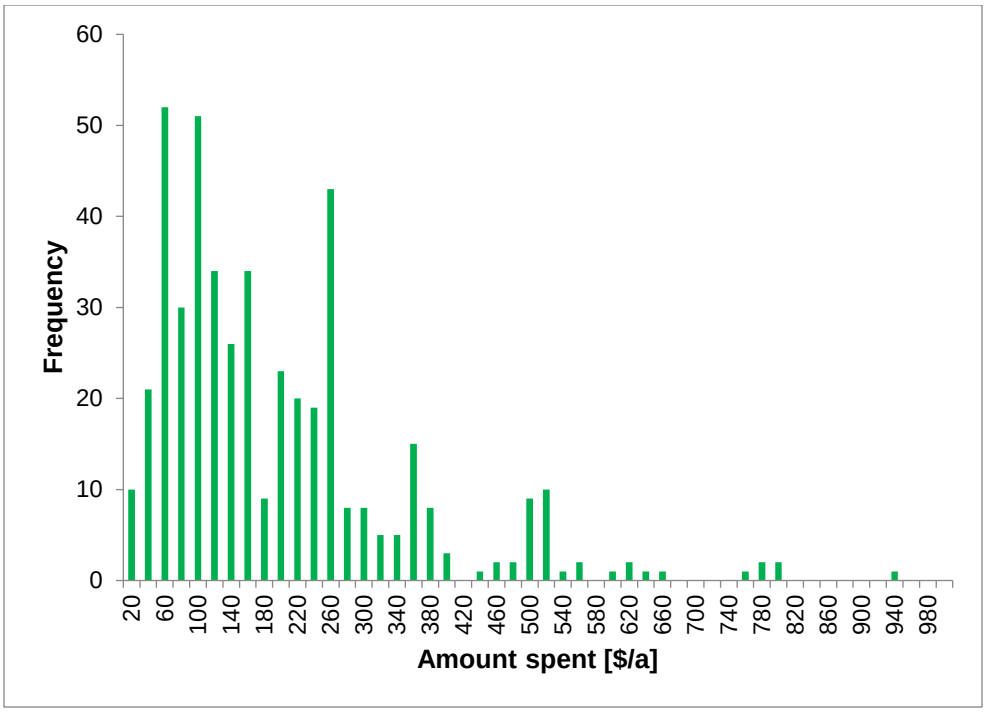


Figure 5. Histogram of respondents' reported annual spending on ornamental plants; bins were selected at $20-increments.

Continuing with the analysis of consumer purchasing behavior, table 6 presents the type of retail outlet used to purchase ornamental plants. The most common primary sources for landscaping materials were Independent Garden Centers (47.1%) and Home Improvement Retailers (35.4%). Home Improvement Retailers are the source that is most widely used, with only 7.1% of the respondents claiming to never buy gardening materials at this source. For seasonal purchases, Independent Garden Centers (25.9%)

and Producers (22.3%) seem to be favored by our respondents. These responses indicate that Independent Garden Centers are the most popular location for purchasing landscaping materials in our survey.

When analyzing the preference for sources by subset, we get a more heterogeneous result. Millennials were found to use Independent Garden Centers significantly more frequently as primary source and less frequently as seasonal source for ornamental plants than the older generations. For respondents from Generation X we find a decreased preference for Home Improvement Retailers as primary source and an increased preference for Independent Garden Centers, compared to Baby Boomers. Millennials are the generation found to most frequently purchase ornamentals directly from the Producer.

Table 7. Classification of different sources for ornamental plants as primary, secondary and seasonal source

	Source type			
	Primary[4]	**Secondary[5]**	**Seasonal**	**Never**
Total Sample				
Supermarket	21.4%	33.0%	25.9%	19.7%
Home Improvement Retailer	35.4%	41.3%	16.2%	7.1%
Independent Garden Center	47.1%	23.3%	15.8%	13.8%
Producer	6.5%	18.1%	22.3%	53.1%
Other Source		7.1%		
Baby Boomers				
Supermarket	15.7%	27.3%	36.4%	20.7%

[4] We were not able to limit respondents to choose only one primary source. Several respondents consequently selected more than one primary source.
[5] Secondary source could be used for more than one source.

Home Improvement Retailer	37.2%	38.0%	18.2%	6.6%
Independent Garden Center	50.4%	24.8%	15.7%	9.1%
Producer	4.1%	15.7%	19.0%	61.2%
Generation X				
Supermarket	18.3%	30.2%	31.4%	20.1%
Home Improvement Retailer	26.6% *	48.5% .	20.1%	4.7%
Independent Garden Center	56.2%	21.9%	13.0%	8.9%
Producer	4.7%	16.6%	27.8% .	51.5% .
Millennials				
Supermarket	28.3% **	39.9% *	13.3% ***	18.5%
Home Improvement Retailer	42.8%	36.4%	11.0% .	9.8%
Independent Garden Center	35.8% *	23.7%	18.5%	22.0% ***
Producer	9.8% .	22.0%	19.1%	49.1% *

Note: Statistical significance was computed via two-sided t-test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation given in parentheses.

Additionally, we asked our respondents if they use other sources than the ones listed. Sources mentioned commonly are online, per mail order, from educational institutions, as well as from friends and family, and to grow them from seed (see Figure 6). Besides the plants received from friends and family, online orders of ornamental plants may be the largest threat to the traditional retail industry. It is to be expected that consumers will increasingly turn to the convenience and large selection found in online shops. Traditional retailers may use this knowledge to start or improve their own online presence, to benefit from this new market trend.

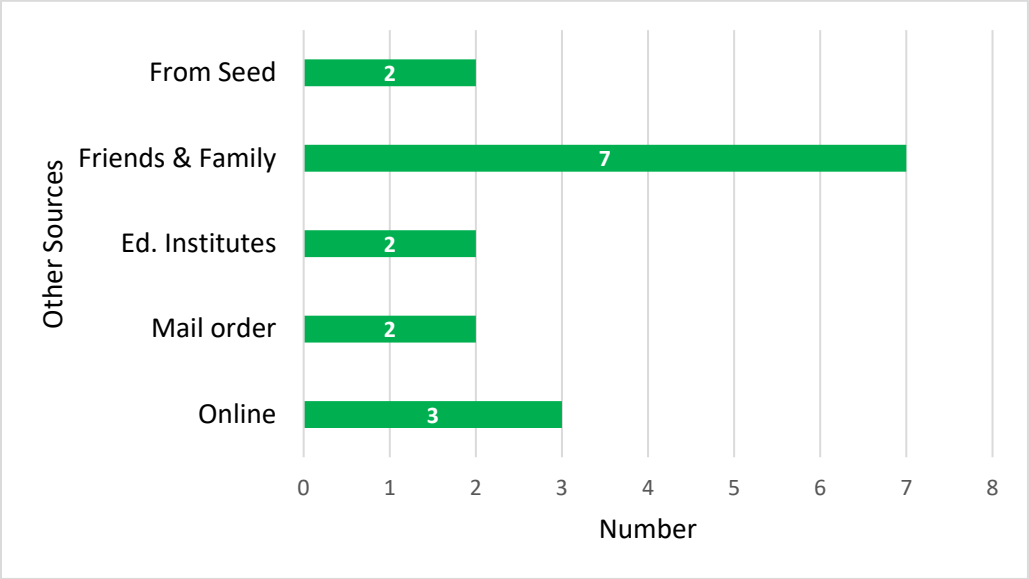


Figure 6. Other sources for landscaping materials

The results regarding consumers' preference for certain store characteristics are summarized in Table 8. In the sample average, the characteristics price, quality, variety and seasonal appropriateness of products were described as very important characteristics in ornamental plants by the respondents. The least important feature of venues for ornamental plants, on the other hand, is familiarity with the manager, followed by local ownership and store value or philosophy, which were reported as only slightly to moderately important. It stands to reason that consumers expect the highest quality for a reasonable price. Seasonal appropriateness is important, as consumers want to be able to buy products most appropriate for the current planting season and weather. The low importance of local ownership, familiarity with the store manager and store value or philosophy may be explained by the increasing market penetration of national retail chains and increasing price sensitivity of consumers. Small nurseries and retailers must therefore find marketing strategies to set themselves apart from large retailers.

When examining generational differences, we find that Millennials place a lower importance on store location, compared to Generation X and Baby Boomers. This result could reflect a higher mobility or will to travel in Millennials. Even though quality is the criterion most important for all generations, respondents from Generation X and Millennials reported lower importance than Baby Boomers for this characteristic when choosing a retailer for ornamental plants. Additionally, we found that Millennials rate a seasonally appropriate range of products as less important to them than the two older generations.

Table 8. Mean importance of shop attributes.

Attribute	**Whole sample**	**Baby Boomers**	**Generation X**	**Millennials**
Familiarity with Manager	2.17	2.18	2.17	2.17
	(1.15)	(1.15)	(1.13)	(1.19)
Location	2.68	2.79	2.75	2.54 *
	(1.09)	(1.15)	(1.08)	(1.05)
Owned by Locals	3.60	3.68	3.58	3.55
	(0.92)	(0.97)	(0.91)	(0.91)
Price	3.92	3.94	3.93	3.90
	(0.87)	(0.85)	(0.85)	(0.90)
Quality	4.31	4.42	4.28 .	4.27 .
	(0.69)	(0.63)	(0.70)	(0.71)
Seasonal Appropriateness of Products	3.83	4.04	3.90	3.62 ***
	(0.90)	(0.82)	(0.88)	(0.94)
Store Philosophy/Value	2.68	2.69	2.67	2.68
	(1.08)	(1.09)	(1.10)	(1.08)
Variety	3.89	3.91	3.98	3.79
	(0.81)	(0.81)	(0.78)	(0.82)

Note: The scale used is 1=”Not at all important”, 2=”Slightly important”, 3=”Moderately important”, 4=”Very important”, 5=”Extremely important”.
Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

As can be seen in table 9, appearance is the most important characteristic for consumers when buying ornamental plants. More than 80% of the respondents consider this characteristic to be very or extremely important (see table 25 Appendix C). The next most important characteristics are maintenance, climate adaption and price. Climate adaption was more important to our respondents than drought tolerance. We can explain this with the harsh winters and hot summers ornamental plants must withstand every year in Utah. In comparison, drought stress can be mitigated through increased irrigation. The characteristics least important to our respondents were whether ornamental plants were grown locally or in Utah.

When comparing the level of importance of ornamental plant characteristics across the generations, we find that Millennials reported a lower importance than the other generations for the following plant attributes: climate adaption, drought tolerance, local production, resistance to disease, seasonality and size.

Table 9. Mean importance of ornamental plant characteristics.

Attribute	Whole Sample	Baby Boomers	Generation X	Millennials
Appearance	4.18	4.26	4.18	4.12
	(0.77)	(0.70)	(0.70)	(0.88)
Climate adaption	3.75	3.97	3.86	3.50 ***
	(0.90)	(0.88)	(0.86)	(0.91)
Drought tolerance	3.25	3.36	3.31	3.11 *
	(1.03)	(0.99)	(0.96)	(1.10)
Grown in Utah	2.67	2.63	2.72	2.65
	(1.04)	(1.11)	(0.98)	(1.05)
Grown locally	2.76	2.90	2.83	2.59 *
	(1.07)	(1.06)	(1.05)	(1.08)
Maintenance	3.87	3.91	3.95	3.77
	(0.82)	(0.79)	(0.70)	(0.95)
Price	3.72	3.74	3.67	3.75
	(0.90)	(0.90)	(0.92)	(0.88)
Resistance to disease	3.55	3.71	3.62	3.37 **
	(0.98)	(0.92)	(0.98)	(0.99)
Seasonality	3.55	3.64	3.61	3.42 .
	(0.97)	(0.95)	(0.91)	(1.03)
Size	3.39	3.50	3.47	3.23 *
	(0.92)	(0.91)	(0.84)	(0.99)

Note: Scale is given as 1=" Not at all important", 2="Slightly important", 3="Moderately important", 4="Very important", 5="Extremely important".

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

5.2 Environmental Attitude

Table 10 summarizes the results for the purchasing history of specially labeled ornamental plants. Most respondents reportedly had bought locally produced, drought tolerant and native plants in the past. This indicates that consumers are aware of the possibility of purchasing these types of ornamental plants. In contrast, only one third of respondents said that they had purchased exotic plants before. Several reasons may be applicable to explain this phenomenon. It is likely that consumers are not aware which plants are considered exotic to the US. Another reason could be that consumers are indeed aware of whether ornamental plants are exotic and decide to not purchase them. With regards to the generational subsets, Baby Boomers had a significantly lower rate of purchasing exotic plants, compared to the younger generations. It is possible that this generation prefers native plants for personal or environmental reasons. On the other hand, Baby Boomers may be less aware of exotic ornamental plants and therefore underreported their purchasing history. We also found that Millennials were less likely to have purchased locally produced plants, compared to the older generations. This result matches the previous finding, where Millennials reported a lower importance for local production of ornamental plants.

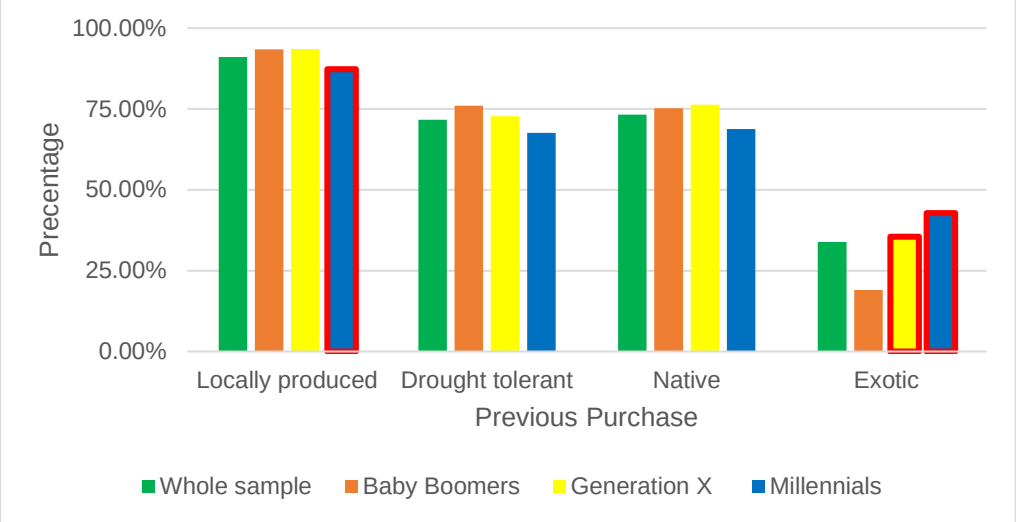


Figure 7. Purchasing behavior regarding specially labeled ornamental plants (locally produced, drought tolerant, native and exotic). Statistically significant differences (Baby Boomers vs Generation X and Millennials) indicated through red outline.

Respondents who never bought drought tolerant plants before were asked for the reason as to why they had never made such a purchase. As can be seen in Figure 7, the most common response was that they did not know where DT plants can be bought. Other answers were that respondents did not know this type of plant was available or that they were not interested in buying them. Millennials, compared to Baby Boomers, significantly more often responded that they were unaware DT plants can be purchased, or that they were of bad quality. Both Millennials and Generation X respondents thought that DT plants were not conventionally available. These assumptions may be explained by the fact that respondents from these generations predominantly shop ornamentals in supermarkets or home improvement retailers, where the product range of ornamental plants is typically smaller, and quality standards may be lower than in independent garden centers. Consequently, none of the Baby Boomer respondents, who mainly purchased ornamental plants in independent garden centers, brought forth these reasons.

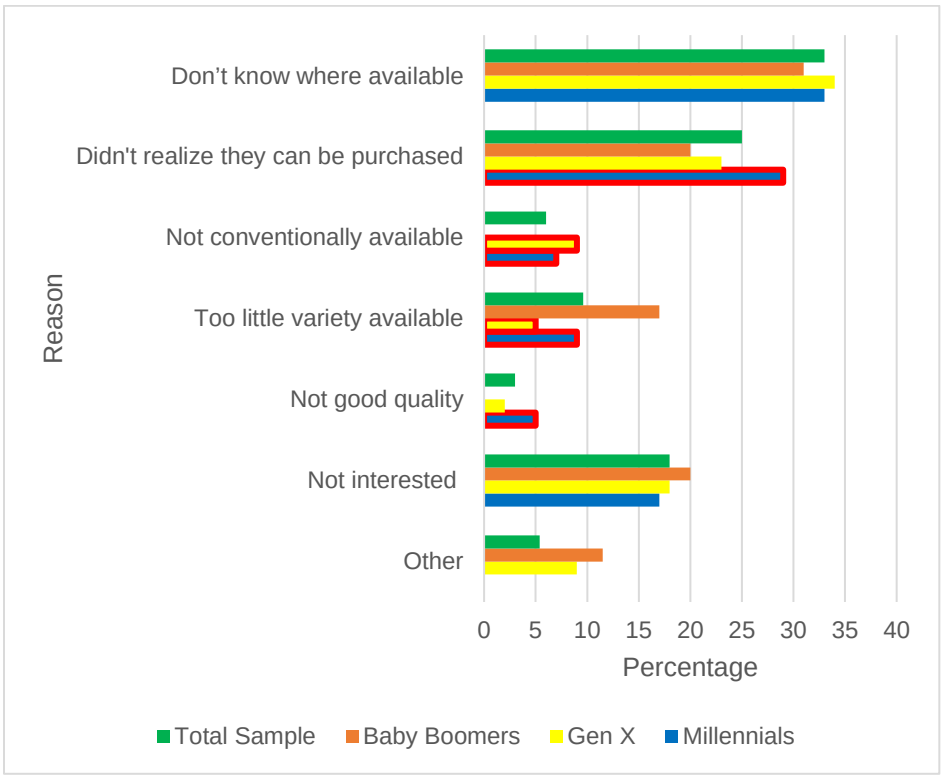


Figure 8. Reasons why respondents had not bought drought tolerant ornamental plants before. Statistically significant differences (Baby Boomers vs Generation X and Millennials) indicated through red outline.

In a further step, we asked what the survey respondents consider as local or regional production of ornamental plants. As can be seen in table 11, the majority of respondents consider the production of ornamental plants within a 50-miles radius or within the county as local, when considering the whole sample. Most respondents deem production within a radius of 100 to 500 miles, as well as within the state and neighboring state as regional. Production within the contiguous United States was considered neither local or regional.

When analyzing for differences between the generations, we find that, on average, Generation X and Millennials have a more generous definition of local and regional production. Noticeable examples are a distance of up to 500 miles and the neighboring state, both of which are still considered regional by Millennials and Generation X, but as neither by Baby Boomers. What we observe here could be a difference in perception between the two generations. One possible explanation to this is that Millennials, growing up in a more globalized and connected world, have increased the limits of what they consider local and regional due to an expansion in global networks, and travel or work experiences. A person who has traveled to other continents will most likely have a different perception of regionality than a person who has never traveled outside his county. To label ornamental plants as local or regional can therefore be a strong selling point especially to the Baby Boomer generation, but may not have much attraction to Millennials, who have a different view on regionality.

Table 10. Perceived regionality

Distance	Whole Sample	Baby Boomers	Generation X	Millennials
50 miles	1.12	1.16	1.10	1.10
	(1.12)	(0.41)	(0.34)	(0.32)
100 miles	1.62	1.79	1.57 ***	1.56 ***
	(1.62)	(0.57)	(0.55)	(0.54)
250 miles	2.12	2.26	2.07 **	2.07 **
	(2.12)	(0.59)	(0.55)	(0.58)
500 miles	2.46	2.65	2.44 **	2.35 ***
	(2.46)	(0.51)	(0.58)	(0.58)
County	1.61	1.60	1.59	1.64
	(1.61)	(0.82)	(0.83)	(0.79)
State	1.85	1.98	1.78 **	1.84 *
	(1.85)	(0.58)	(0.56)	(0.63)
Neighboring State	2.38	2.50	2.31 **	2.35 *
	(2.38)	(0.52)	(0.53)	(0.57)
Contiguous USA	2.80	2.87	2.79 .	2.75 *
	(2.80)	(0.39)	(0.41)	(0.45)

Note: Scale used is 1=”Local”, 2=”Regional”, 3=”Neither”.

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

Table 12 summarizes the results regarding our respondents’ frequency of adoption of eco-friendly activities. Recycling was the most frequently adopted activity among the respondents. Another widely adopted environmental activity is to vote or campaigning for environmental issues, which 33.7% of the respondents claim to engage in always or frequently (see table 23, Appendix B). The activities which are the least adopted among our participants are the use of alternative fuel or hybrid vehicles, the purchase of carbon offset certificates and the use of electricity from renewable sources.

We found several differences regarding eco-friendly activities among the three generations observed. The most remarkable is the difference in using the bike or public transport as a means of transportation to get to work. Both Baby Boomers and Generation X respondents were significantly less frequently using this method of transportation, compared to Millennials, who use this means of transportation significantly more frequently. One reason could be that the younger Millennial respondents possess the physical fitness necessary to drive to work by bicycle. Additionally, Millennials may choose to use the bike or public transport for environmental reasons. Millennials were also found to be more frequent in donating to environmental organizations and to use electricity from renewable sources than Generation X and Baby Boomers. Political involvement, such as voting or campaigning for environmental issues, on the other hand, is more frequently conducted by Baby Boomers and Generation X than by Millennials.

Table 11. Frequency of climate friendly activities

Attribute	**Whole Sample**	**Baby Boomers**	**Generation X**	**Millennials**
Riding the bicycle/using public transport	3.45 (0.77)	3.71 (0.60)	3.59 (0.65)	3.14 *** (0.89)
Buying carbon offset certificates	3.79 (0.58)	3.86 (0.52)	3.80 (0.57)	3.75 (0.61)
Donating to environmental organizations	3.38 (0.74)	3.50 (0.59)	3.38 (0.78)	3.29 * (0.79)
Using electricity from renewable sources	3.43 (0.92)	3.55 (0.84)	3.45 (0.92)	3.32 * (0.97)
Recycling	1.83 (0.92)	1.86 (0.92)	1.87 (0.95)	1.77 (0.90)

Using alternative fuel vehicles	3.71	3.66	3.78	3.67
	(0.73)	(0.85)	(0.66)	(0.72)
Voting or campaigning on	2.79	2.69	2.73	2.92 .
environmental issues	(1.04)	(1.06)	(1.05)	(1.02)

Note: Scale used is 1=”Always”, 2=”Frequently”, 3=”Sometimes”, 4=”Never”.

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation given in parentheses.

In our sample, most people think that it is harmful to the environment to not recycle (see table 13). Only 2.2% of participants stated not to see this activity as causing any damage (see table 24, Appendix B). Other activities were more controversial. Among our respondents the emission of greenhouse gasses and climate change were seen as inflicting slight to moderate damage to the environment, with 87% and 89.2% of respondents, respectively, crediting these actions some magnitude of damage. The actions seen as least damaging are the use of water and fertilizer in landscaping, being thought of as slightly damaging to the environment. This may be due to a more widespread knowledge of the harm of climate change and greenhouse gas emissions. Additionally, recycling may be regarded as easier to adopt on an individual level.

Throughout all generations, it was regarded most harmful to the environment to not recycle. We found that Millennials have a significantly higher concern about the damage that climate change and greenhouse gas emissions may cause than the older two generations. It is possible that Millennials are the generation with the most education and media exposure regarding climate change, greenhouse gas emissions and the growing problem of environmental pollution due to waste.

Table 12. Mean level of reported damage estimation of environmental actions

Action	Whole Sample	Baby Boomers	Generation X	Millennials
Climate Change	2.77	2.59	2.67	2.99 ***
	(1.01)	(1.01)	(1.04)	(0.93)
Fertilizer Use in Landscaping	2.25	2.29	2.31	2.17
	(0.85)	(0.79)	(0.93)	(0.80)
Greenhouse Gas Emissions	2.76	2.6	2.71	2.92 **
	(0.99)	(0.90)	(1.04)	(0.98)
Water Use in Landscaping	2.34	2.44	2.31	2.29
	(0.86)	(0.90)	(0.87)	(0.83)
Not Recycling	3.18	3.17	3.1	3.28
	(0.81)	(0.78)	(0.86)	(0.79)

Note: Scale used is 1="No Damage", 2="Slight Damage", 3="Moderate Damage", 4="Much Damage". Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

In a further step we questioned our survey respondents on their position regarding several water use issues. As can be seen in table 14, on average our respondents were uncertain whether they are living in a state of drought. This stands in contrast to reality, as shown in the introduction. Most respondents agree that their actions at home can help protect water resources, and that it is not too hard for an individual to do so. But when considering whether the maintenance of ornamental plants in landscaping needs significant amounts of water, most of our respondents disagree. This, again, does not reflect the reality of water use in landscaping, which accounts for 60% of household water consumption. We conclude that there is a gap in awareness regarding landscape maintenance water consumption. While our respondents somewhat agree that the

purchase of DT plants can help save water resources, they are uncertain whether they are willing to pay a higher price for DT plants in order to protect water resources.

Again, we found some significant differences in the ways the different generations regard water issues. Baby Boomers were more likely to agree that actions at home can help to protect water resources, and that it is not too hard for an individual to save water, than Generation X and Millennials. Similarly, Baby Boomers were significantly more likely to think that the purchase of DT plants can help protect water resources. Finally, we found that among Millennials drought awareness is lower, when compared to Generation X and Baby Boomers.

Table 13. Mean level of agreement with respect to water use issues

Water use issue	Whole Sample	Baby Boomers	Generation X	Millennials
WtrAct	4.68 (1.04)	5.00 (0.85)	4.70 * (1.10)	4.45 *** (1.04)
WtrDrt	4.57 (1.32)	4.69 (1.20)	4.70 (1.26)	4.36 * (1.43)
WtrDT	4.61 (1.05)	4.88 (0.90)	4.65 . (1.09)	4.39 *** (1.08)
WtrInd	2.04 (1.42)	1.69 (1.28)	2.08 * (1.44)	2.24 *** (1.46)
WtrMtn	3.40 (1.19)	3.28 (1.18)	3.39 (1.25)	3.50 (1.13)
WtrPrc	3.79 (1.34)	3.74 (1.30)	3.71 (1.43)	3.89 (1.27)

WtrAct: My actions to conserve water at home will help protect water resources.
WtrDrt: Water shortages and drought are a concern where I live.
WtrDT: Purchasing “drought tolerant” labeled plants will help protect water resources.
WtrInd: It is too hard for an individual to protect our water resources.
WtrMtn: The maintenance of ornamental plants requires significant amounts of water.
WtrPrc: I am willing to pay higher prices for drought tolerant ornamental plants to protect water resources.

Note: Scale used is 1=”Strongly disagree”, 2=”Disagree”, 3=”Somewhat disagree”, 4=”Neither agree nor disagree”, 5=” Agree somewhat Agree”, 6=”Agree”, 7=”Strongly agree”.

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

On average, our respondents were only slightly concerned about the price of water, in general and when making landscaping decisions. This is most likely caused by the low water prices in Utah, compared to the surrounding states. Baby Boomers showed a significantly higher concern about the price of water than Generation X and Millennials. This may be due to this generation's increased drought awareness.

Table 14. Mean levels of concern about the price of water

Water price	**Whole Sample**	**Baby Boomers**	**Generation X**	**Millennials**
In general	2.27	2.68	2.22 ***	2.03 ***
	(1.15)	(1.07)	(1.13)	(1.17)
When making landscaping decision	2.39	2.7	2.29 ***	2.26 ***
	(1.13)	(0.95)	(1.13)	(1.20)

Note: Scale used is 1="Not at all concerned", 2="Slightly concerned", 3="Somewhat concerned, 4="Moderately concerned", 5="Extremely concerned".
Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

5.3 Choice Experiment Results

The following sections discuss the results from the logit models used to analyze the choice experiment. As discussed above, we calculated our respondents' WTP with a multinomial logit (MNL) model. The first model presented was calculated using choice attributes only (Base Model). The results of this model can be found in table 16. We can see that in the Base Model, the intercepts for daylilies and spiderwort are positive and

significant, meaning that the average respondent is willing to pay a premium for any of the two flowers over the option to buy neither. On average, our respondents preferred daylilies over spiderwort. We do not find a statistically significant WTP for any flower color level, i.e. the sample average was not shown to prefer one flower color over the other. For irrigation need, on the other hand, we find a significant difference between daylilies' base level *Minimal Irrigation Need* compared to *Yellow Tag*, as well as spider spiderwort's base level *No Claim* compared to *Frequent Irrigation Need*. Our respondents are willing to pay a premium of $0.85 for daylilies labeled with the Yellow Tag, compared to the plants labeled as *Minimal Irrigation Need*. For spiderwort labeled as *Frequent Irrigation Need*, on the other hand, our respondents demand a discount of $1.80, compared to the base level without irrigation claim. There is no significant WTP for any production locations over *No Location Claim*.

Table 15. WTP estimates of MNL Base Model

Intercept, daylilies	**Intercept, spiderwort**	**Orange**	**Purple**	**Yellow Tag**	**Frequent irrigation**	**Grown in Utah**	**Grown in Western US**
14.079***	7.731***	-0.085	0.161	0.845**	-1.789***	0.201	-0.203
(0.490)	(0.403)	(0.269)	(0.378)	(0.274)	(0.407)	(0.256)	(0.280)

Note: Significance levels are given at 0.001 (***), 0.01 (**), 0.05 (*) and 0.1(.). Standard errors in parenthesis.

Based on the insignificant WTP estimates for flower colors and production locations in the base model, we will focus on the discussion of the effect of interaction terms on WTP for irrigation need labels. However, all results can be found in Appendix C.

Table 17 summarizes the marginal effects of certain socio-demographic and attitudinal interaction terms on WTP. We found that females are willing to pay a premium of up to $0.99 for plants labeled *Yellow Tag*. This sets them apart from our male survey respondents, for whom we did not detect a significant WTP. When examining the effect of age on WTP, we found inhomogeneous results. The youngest age category, aged 18 to 24 years, was not found to have a significant WTP for the Yellow Tag, but most of the older age categories exhibited the willingness to pay premiums of up to $1.47 for such plants. The analysis of generations mostly reflects these findings, as it shows significant WTP coefficients for Generation X and Baby Boomers, but hides the fact that some of the respondents, who are considered Millennials, were indeed willing to pay a premium. These results match previous studies' findings, which describe younger generations as less interested in environmental concerns (Twenge et al., 2010, 2012). We found that the education levels of High School Diploma, Some College and Associate's Degree were correlated with a significant premium for Yellow Tag labeled plants. The absence of significant values for higher education levels, such as Bachelor's and Master's Degrees, is notable, as previous studies linked a higher education to an increase in environmental concern (Rihn et al., 2015; Yue et al., 2011). A slightly below average income was found to be the only category among our survey participants willing to pay a significant premium for *Yellow Tag* labeled plants ($1.24). Marital state was found to correlate with WTP for the *Yellow Tag*, too. Both married respondents and those in another form of relationship were found to be willing to pay premiums for the *Yellow Tag* labeled plants. Our interpretation is that singles usually do not live in houses with large gardens, and therefore may not see the economic benefit from a Water-Wise plant. This

result correlates with the finding that only individuals living in single houses exhibited significant WTP premiums for the *Yellow Tag* ($0.79), but none of the other housing types. Households both with and without children, finally, are associated with a WTP for the *Yellow Tag*, albeit the significance for households with children is weaker and may disappear in a larger sample. This would match previous findings, which revealed that households with children have a lower likelihood to purchase ornamental plants from sustainable production methods (Rihn et al., 2015, 2016). A possible explanation for this observation could be a more restricted household budget in families with children, compared to those without.

When examining the effect of participants' level of expertise in gardening on WTP for the *Yellow Tag*, we found that an average experience is associated with a positive marginal WTP for the *Yellow Tag* ($1.27). For respondents with a higher level of expertise, no statistically significant premiums were found. This result is contrary to previous literature, which showed that an increase in in time spent gardening, which likely leads to an increase in experience, correlates with a higher preference for DT labeled plants (Fan et al., 2017). Overall, respondents with a higher concern for water price, both in general and when making landscaping decisions, were more likely to pay a premium for daylilies labeled *Yellow Tag*. The highest marginal premium was estimated for respondents who are extremely concerned about the price of water ($1.54-$2.24). Finally, we analyzed the correlation between participants' level of agreement with certain water issue statements and WTP for the *Yellow Tag*. We found that respondents who clearly indicate a willingness to buy and pay premiums for DT plants do indeed have a significant WTP for the *Yellow Tag*, as estimated from the choice experiment.

Respondents who previously reported a strong WTP a premium for DT plants were found to be willing to pay marginal premiums of up to $2.83 for daylilies labeled with the *Yellow Tag*. From this we can conclude that consumers' positive attitude towards DT plants may carry over into real life shopping scenarios. Drought awareness, on the other hand, gave inhomogeneous results. As expected, participants with a high drought awareness showed a significant WTP for plants labeled with the *Yellow Tag*. Although we would not expect consumers with a low drought awareness to be significantly interested in DT plants and the *Yellow Tag,* we did find a significant WTP for those respondents, too. We think it may be possible that these respondents either made out an economic benefit from plants with lower watering requirements, or simply preferred the esthetics of the daylily.

In comparison, the effects of socio-demographic and attitudinal interaction terms on the WTP for the *Frequent Irrigation Need* label, compared to plants without irrigation claim, are summarized in table 18. Most respondents required a discount for spiderwort labeled *Frequent Irrigation Need* over spiderwort without irrigation claim. Both males and females required a discount for the *Frequent Irrigation Need* label, but for females this discount was higher ($1.86) than for men ($1.52). The result that women punish a high irrigation need in ornamental plants more strongly dovetails our findings for the *Yellow Tag*, where we showed that women, but not men, reward DT plants by paying a premium. All but the youngest age category was found to require a significant discount for the *Frequent Irrigation Need* label. The highest discount ($4.41) was required by the oldest age category, aged 65 years and older. Respondents in this age category may be more price sensitive, due to limited budget after retirement, and therefore punish a high

irrigation need strongest. All generations showed significant negative WTP estimates for the *Frequent Irrigation Label*. Unlike the result for the *Yellow Tag*, Millennials do require a significant discount for ornamentals labeled *Frequent Irrigation Need*. Education above the high school diploma was found to be associated with a significant negative WTP for spiderwort labeled *Frequent Irrigation Need*. There appears to be a trend towards a higher discount required with an increase in education, as respondents with a Master's Degree required the highest discount ($3.66). Significant discounts were also required by all income categories below, as well as slightly above the Utah Census 2016 average income. We find this matches the research of Fan, McCann and Qin (2017), which reported a higher DT plant adaption in households with below and above average income. Following their reasoning, we expect that below average income households punish plants with a high irrigation need due to economic reasons (high water bill), whereas high income respondents may be more willing to punish those plants for their negative impact on water resources. Contrary to the finding for the *Yellow Tag* label, both singles and married respondents required a discount for spiderwort labeled *Frequent Irrigation Need*, compared to those without irrigation claim. The marginal discount required was highest for participants who are single, at $1.86. Both households with and without children showed a negative WTP for a high irrigation need, but those with children required a significantly higher discount ($3.38). Families with children may be more price sensitive regarding ornamental plants. While only respondents living in single houses were found to be willing to pay a premium for the *Yellow Tag*, respondents from all housing types required a discount on spiderwort labeled *Frequent Irrigation Need* ($2.19-$4.30). This finding is particularly interesting, as it means that even consumers

who are unlikely to have a garden see a high irrigation need as a negative trait and are willing to punish this characteristic.

All gardening expertise levels from *Novice* to *Proficient* were found to show negative marginal WTP for plants labeled *Frequent Irrigation Need* ($1.27-$3.23); the highest level of expertise is insignificant due to a very small number of participants considering themselves an *Expert*. These results indicate that respondents had a lower preference for a high irrigation need in ornamental plants, no matter what their level of expertise in gardening. Similarly, preference for the high irrigation labeled spiderwort was decreased across all levels of concern regarding water price, both in general and when making landscaping decisions. Even respondents who stated to feel no concern at all regarding the price of water were found to require a discount for spiderwort labeled *Frequent Irrigation Need* over spiderwort without irrigation claim; those participants even required a higher marginal discount ($3.1-$3.64) than respondents who indicated to be extremely concerned about the price of water ($2.07-$2.28). When examining the effect of attitude regarding certain water issues, we find results matching those for the *Yellow Tag*: Individuals who stated willingness to buy, and to pay premiums for DT plants were found to require discounts of up to $3.46 for spiderwort labeled *Frequent Irrigation Need* over spiderwort without irrigation claim. The stronger respondents agreed that buying DT plants helps to protect water resources, the higher was the discount they required for a high irrigation need. An increase in drought awareness was also found to be associated with a significant discount required.

Table 16. WTP estimates for the Yellow Tag over Minimum Irrigation Need

Gender	**Male**	**Female**				
	0.27	0.99 **				
	(0.54)	(0.3)				
Age	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**
	-0.56	1.47 *	0.79	1.3 *	1.19 .	1.01 .
	(0.66)	(0.66)	(0.53)	(0.62)	(0.6)	(0.51)
Gen	**Millennial**	**Generation X**	**Baby Boomers**			
	0.54	1.02 *	1.09 *			
	(0.48)	(0.42)	(0.4)			
Edu	**No High School**	**High School Diploma**	**Some College**	**Associate's Degree**	**Bachelor's Degree**	**Master's Degree**
	-0.48	1.63 **	0.84 .	1.64 *	0.17	1.00
	(2.35)	(0.6)	(0.49)	(0.82)	(0.44)	(0.66)
Income	**<$20,000**	**$20,000-$39,999**	**$40,000-$59,999**	**$60,000-$79,999**	**$80,000-$99,999**	**≥100,000**
	1.07	0.51	1.24 *	0.3	0.98	1.29
	(0.81)	(0.52)	(0.52)	(0.55)	(0.6)	(0.88)
Marital State	**Single**	**Married**	**Other**			
	0.62	0.71 *	3.23 **			
	(0.47)	(0.32)	(1.03)			
Children	**No**	**Yes**				
	1.13 **	1.6 .				
	(0.42)	(0.85)				
Housing Type	**Single House**	**Attached House**	**Apartment**	**Other**		
	0.79 **	0.17	-0.41	-0.23		
	(0.3)	(1.43)	(0.65)	(1.36)		
Level of Expertise	**Novice**	**Some Experience**	**Competent**	**Proficient**	**Expert**	
	0.57	0.53	1.27 **	1.03	6.53	
	(0.53)	(0.41)	(0.46)	(0.77)	(8.61)	
Water Price	**Not at all concerned**	**Slightly Concerned**	**Somewhat concerned**	**Moderately concerned**	**Extremely concerned**	
General	0.66	0.29	0.84 .	0.58	2.24 **	
	(0.74)	(0.59)	(0.46)	(0.46)	(0.69)	
Landscaping	0	0.23	1.39 *	0.76 .	1.54 *	
	(0.84)	(0.48)	(0.62)	(0.42)	(0.61)	
Water Issues	**Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
WtrDT	-0.18	-0.24	0.81	-0.05	1.19 **	2.13 ***
	(1.61)	(1.28)	(0.6)	(0.46)	(0.42)	(0.63)
WtrDrt	-0.50	3.29 **	0.69	0.77	1.0 *	0.55
	(1.03)	(1.18)	(0.70)	(0.55)	(0.44)	(0.52)
WtrPrc	-0.57	0.39	0.09	1.22 **	1.86 ***	2.83 *
	(0.61)	(0.75)	(0.52)	(0.47)	(0.56)	(1.17)

Note: Significance levels given at 0.1 (.), 0.05 (*), 0.01 (**) and 0.001 (***). Standard error in parenthesis.

Table 17. WTP estimates for Frequent Irrigation Need over no irrigation claim

Gender	**Male**	**Female**				
	-1.52 *	-1.86 ***				
	(0.77)	(0.44)				
Age	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**
	-0.71	-1.54 *	-2.31 **	-1.86 *	-2.68 *	-4.41 ***
	(0.77)	(0.78)	(0.78)	(0.89)	(1.1)	(1.26)
Gen	**Millennial**	**Generation X**	**Baby Boomers**			
	-1.29 *	-2.18 ***	-3.59 ***			
	(0.59)	(0.62)	(0.85)			
Edu	**No High School**	**High School Diploma**	**Some College**	**Associates Degree**	**Bachelor's Degree**	**Master's Degree**
	3.31	-1.07	-1.66 *	-2.65 *	-1.76 **	-3.66 **
	(2.34)	(0.77)	(0.68)	(1.13)	(0.61)	(1.35)
Income	**<$20,000**	**$20,000-$39,999**	**$40,000-$59,999**	**$60,000-$79,999**	**$80,000-$99,999**	**≥100,000**
	-3.39 *	-1.3 .	-1.88 **	-0.77	-3.66 **	-2.22
	(1.48)	(0.68)	(0.72)	(0.68)	(1.19)	(1.19)
Marital State	**Single**	**Married**	**Other**			
	-1.86 **	-1.77 ***	-0.68			
	(0.7)	(0.46)	(1.16)			
Children	**No**	**Yes**				
	-2.71 ***	-3.38 **				
	(0.74)	(1.07)				
Housing Type	**Single House**	**Attached House**	**Apartment**	**Other**		
	-2.19 ***	-4.3 *	-3.22 ***	-3.24 *		
	(0.47)	(1.92)	(0.78)	(1.63)		
Level of Expertise	**Novice**	**Some Experience**	**Competent**	**Proficient**	**Expert**	
	-1.27 .	-1.87 **	-1.39 *	-3.23 **	-84.4	
	(0.71)	(0.6)	(0.63)	(1.16)	(15704)	
Water Price	**Not at all concerned**	**Slightly Concerned**	**Somewhat concerned**	**Moderately concerned**	**Extremely concerned**	
General	-3.1 *	-0.8	-1.57 *	-2.11 **	-2.28 *	
	(1.31)	(0.74)	(0.64)	(0.65)	(0.99)	
Landscaping	-3.64 *	0.23	-2.5 *	-2.43 .	-2.07 *	
	(1.49)	(0.56)	(0.87)	(0.65)	(0.91)	
Water Issues	**Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
WtrDT	-5.39 .	0.59	-0.12	-1.63 **	-1.9 **	-3.46 **
	(2.88)	(1.41)	(0.74)	(0.63)	(0.58)	(1.09)
WtrDrt	-0.61	0.32	-2.25	-1.18 .	-1.93 **	-2.81 ***
	(1.25)	(1.20)	(1.09)	(0.72)	(0.62)	(0.82)
WtrPrc	-1.00	-1.27	-0.65	-2.83 ***	-1.40 *	-2.38
	(0.84)	(0.97)	(0.66)	(0.72)	(0.72)	(1.61)

Note: Significance levels given at 0.1 (.), 0.05 (*), 0.01 (**) and 0.001 (***). Standard error in parenthesis.

CHAPTER 6 - CONCLUSIONS

Our research differs from the existing literature in several significant ways. Primarily, it is the first study regarding Utah residents' preferences for the *Yellow Tag*, which has been used by nurseries for more than 15 years. Secondly, it will give insight into Utah residents' preferences and attitudes regarding ornamental plants and retailers of ornamentals, as well as environmental issues. Lastly, the examination of possible differences in preferences and attitudes across different generations for Utah residents will add to the growing body of literature dedicated to generational differences in environmental attitude and behavior.

We applied an online survey to 463 Utah residents to gather information about their demographics, preference and attitude regarding ornamental plants, retailers of ornamentals and environmental issues, as well as on their preferences in a choice experiment. While our survey sample may not be exactly representative of the average Utah consumer, we argue that it reflects the main consumer group of ornamental plants. The largest differences in socio-demographic characteristics between our survey sample and the census are gender, age, marital state and type of housing. The literature indicates that the individuals in charge of a household's ornamental plants purchases are typically female and middle aged (Yue & Behe, 2008). This fits the demographics of our survey sample, which is predominantly female, middle aged, married and occupies single houses. Our survey pre-selected this consumer segment to a certain extent (minimum age, responsibility for ornamental plant shopping), while others are typically correlated, such as affinity for gardening with marital status and housing type. Although consumers of

Latino or Hispanic ethnicity are underrepresented, racial groups reflect the Utah Census 2016 well in our survey sample. Significant differences to the Utah Census 2016 were found with regards to education and income: Our sample has a significantly higher level of education, but lower level of income than the Utah Census 2016 indicates. While a higher level of education may cause a higher awareness for environmental issues, such as drought or climate change, a lower level of income may increase price sensitivity of our consumer sample. We need to be wary about both biases when continuing with the interpretation of our results.

6.1 Preferences, Shopping and Environmental Attitude

On average, our survey respondents classified themselves as average experts in gardening. The gardening materials purchased most frequently are annual plants and fertilizer/pesticide/soil amendments, bought on average every six to twelve months. Ornamental trees and shrubs are bough less frequently, on average only every two years. The mean annual spending on ornamental plants amounted to $187, with the median spending ranking slightly lower at $145. The most frequently used primary sources for ornamentals among our respondents are Independent Garden Centers and Home Improvement Retailers. The source least likely to be used is directly from Producers, which more than half of respondents never use. The two most frequently mentioned competitors to these sources are friends and family, as well as online stores. The characteristics of retail outlets of ornamental plants most important to our respondents are quality, price, variety and seasonal appropriateness of products, being categorized very

important on average. The least important are familiarity with the manager, location and store philosophy, which were categorized as slightly to moderately important. This may reflect the growing appearance and influence of nationwide store chains, which do not place high importance on store philosophy, but rather focus on price differentiation. The individual characteristics of ornamental plants most important to our participants are appearance, maintenance, climate adaption and price. The higher importance placed on climate adaption, compared to drought tolerance, may be explained by a gardener's possibility to mitigate drought damage by watering frequently, whereas heat and cold damage are harder to prevent. The characteristics ranked lowest in mean importance are both variants of local production ("produced locally", "produced in Utah"). This finding is supported by the results from our choice experiment, where we see that respondents do not have a significant WTP for local or regional production. Our participants were aware of ornamental plants labeled "locally produced", "drought tolerant" and "native", as they had been purchased by 91%, 71.7% and 73.2% of respondents, respectively, in the past. Plants labeled as "exotic" had been purchased by only 33.9% before. One reason may be that most consumers are unaware of which ornamental plants are exotic to the US. The respondents' main reasons for not having bought DT ornamental plants before were "Do not know where they are available", "Didn't realize they can be purchased" and "Not interested". Production within 100 miles or within the county are perceived as local, whereas a distance of up to 500 miles and within the state or neighboring state are perceived as regional. Production within the contiguous USA is regarded neither local nor regional. The eco-friendly activity most frequently adopted among the respondents is recycling, followed by voting or campaigning on environmental issues, which are also the

means least costly to anybody adopting them. The least frequently used, approaching "never", is the purchase of carbon offset certificates. To not recycle is, consequently deemed as the action with the highest damage potential, followed by greenhouse gas emissions and climate change. On average, the survey respondents think that an individual's actions can help preserve water, but most of them are unsure whether the maintenance of ornamental plants requires significant amounts of water. This hints at a general unawareness of how much residential water is used for irrigation purposes. This interpretation is supported by the finding that respondents were only slightly more concerned about the price of water when making landscaping decisions, than in general.

6.2 WTP for the Yellow Tag

In general, we find that our survey respondents were willing to pay a significant premium for daylilies labeled with the *Yellow Tag*, compared to those labeled "minimum irrigation need". Discounts were required for spiderwort labeled as "frequent irrigation need", compared to plants without irrigation claim. The magnitude, and sometimes significance, of the premium and discount depends on various factors, such as gender, age and number of kids, but also on the type of logit model. The basic multinomial logit models estimate a premium of approximately $0.85 for the Yellow Tag, and a discount of $1.78 to $2.09 for spiderwort with the "frequent irrigation need" label. The highest discount required increased when taking the number of children per household into account and may hint at a growing price sensitivity for an increase in household size. When sub-setting the data by gender, we find that only females exhibit a significant WTP

for the Yellow Tag in daylilies; they are willing to pay a premium of up to $0.92 for this characteristic. Whereas for both men and women the WTP is significantly lower for spiderwort labeled as “frequent irrigation need” compared to spiderwort without claim, men require a higher discount than women. Across all models, age correlates with an increase in price sensitivity, and therefore a decrease in WTP for any of the irrigation claims. The study by Smith and Bower (2012) we discussed previously found that Millennials navigated products by searching for specific symbols and labels, such as the green recycling point. In combination with our own findings we postulate that the *Yellow Tag* can be a valuable and easy-to-spot indicator for customers who are looking for DT ornamental plants.

6.3 Generational Differences in Preference, Behavior and WTP

The results from our analysis reveal that there are significant generational differences in preference and shopping behavior towards ornamental plants, as well as in environmental attitude and WTP for certain labels. Our findings largely match what has been previously described in the literature. We found that Generation X had the highest annual spending on ornamental plants, followed by Millennials. The different generations also exhibited significant differences regarding shopping behavior. Whereas more than 50% of Baby Boomers and Generation X respondents used Independent Garden Centers as their primary source for ornamental plants, the share of Millennials shopping ornamentals at garden centers is far lower. Instead, Millennials favored Home Improvement Retailers and Independent Garden Centers. Although Producers were the

least used source for ornamentals among all generations, Millennials used it significantly more often as a primary source than the older generations. This finding hints at a split inside the Millennial generation. On the one hand they gravitate towards a more convenient lifestyle using Independent Garden Centers to possibly cut down on shopping trips, but on the other hand, they may also realize the environmental and communal benefit of shopping directly at the Producer.

While we did not see any differences in preference for most of the presented store characteristics, Baby Boomers and Generation X seemed to place a significantly higher importance on seasonal appropriateness of products than Millennials. Both Generation X and Millennials exhibited a slightly decreased importance for quality. We conclude that Baby Boomers especially value tradition and quality. This coincides with Parment's (2013) description of the Baby Boomer generation as being the most service-oriented. When examining the importance of ornamental plant characteristics we can see differences between Baby Boomers and Generation X on the one hand, and Millennials on the other. Millennials were found to place a significantly lower importance on climate adaption, drought tolerance, local production and seasonality than the older generations. Many of these characteristics are intrinsic factors whose benefit to the customer, such as a lower need for pesticides or lower water requirements, become apparent only in the long-run. Since the status of price or appearance is not significantly different among the generations, we may assume that for Millennials eco-friendly attributes rank lower in importance than price when shopping for ornamentals. Millennials were also more likely than Baby Boomers or Generation X to have bought exotic plants before, but less likely to have purchased locally produced ornamentals. As we already argued, there may be

several interpretations as to why generations differ when purchasing exotic plants. One reason why Millennials may place lower importance on local production can be found in their responses to what they consider local/regional. We saw that both Generation X and Millennials had a broader definition for local/regional production than Baby Boomers. Notably, Generation X and Millennials on average defined a distance of up to 500 miles still as regional, whereas Baby Boomers recognized it neither as local nor regional. Millennials' broader definition of the terms local/regional may also be one reason why they placed a lower importance on this characteristic. Although Millennials exhibited a lower importance for eco-friendly attributes in ornamental plants, they showed an increased frequency in climate friendly activities. We found that Millennials more frequently used public transport or the bicycle to travel to work, donated to environmental organizations and used electricity from renewable sources, compared to the older generations. The only activity where they fell behind Baby Boomers and Generation X was voting or campaigning for environmental issues. Millennials ranked the estimated the damage caused by climate change and greenhouse gas emissions higher than Baby Boomers and Generation X. But Millennials were also consistently more doubtful when asked whether they think that they can help preserve water resources on a personal level. Additionally, they agreed significantly less with the statement that they lived in a place of drought than older generations, hinting at a low drought awareness. We found a significant WTP a premium for plants labeled with the *Yellow Tag* among Baby Boomers ($1.13) and Generation X ($0.79), but not for Millennials. All generations required discounts for spiderwort labeled *Frequent Irrigation Need*, with Baby Boomers ranking highest ($3.57), followed by Millennials ($1.70) and Generation X ($1.61).

As of today, Baby Boomers still are the generation with the highest purchasing power and most stable life situation, making them the preferred customer segment for ornamental plants among the three generations examined (Fuller, 2013; Tilford, 2018). Our results confirmed that they have great loyalty for retailers and place importance on service, tradition and quality. In our sample, this generation was the most drought aware and the most concerned about the price of water of the three generations. Consequently, Baby Boomers were most likely to have bought DT plants before. They also stated a higher WTP for DT plants, which was later confirmed in our choice experiment.

Generation X's attitude and behavior was often found to be in between Baby Boomers' and Millennials'. While Generation X's shopping and environmental behavior was not significantly different from Baby Boomers', they had attitudes regarding local/regional considerations and water issues similar to Millennials.

Millennials, on the other hand, were found to be a generation with a high level of information regarding environmental issues, but a low sense of personal responsibility or influence on these matters. This coincides with findings of previous studies, which pointed out that Millennials awareness of environmental issues does not necessarily translate into a strong civic attitude (Alsop, 2008; Arnett, 2013; Heo & Muralidharan, 2017; Twenge et al., 2010). In their 2017 study, Heo and Muralidharan conceded that there appears to be an attitude-behavior gap among Millennials, who are shown to be informed and engaged in environmental issues, but to not necessarily exhibit the consumer behavior one would expect. The researchers concluded that Millennials are in

favor of green products, so long as they are affordable and made from recyclable materials. Our results confirm this assessment.

6.4 Opportunities for Nurseries

Our results reveal that in general consumers preferred daylilies over spiderwort and are willing to pay significant premiums for daylilies labeled with the *Yellow Tag*. On the other hand, labels indicating a *Frequent Irrigation Need* cause most consumers to require discounts. Production location and flower color did not appear to influence respondents' WTP, and nurseries may therefore have little economic benefit from indicating in on labels of ornamental plants among Utah consumers. From our results, nurseries may be able to target customer segments more effectively. While women are generally more likely to pay premiums for the *Yellow Tag*, male customers could be attracted by advertising the economic benefits of water-wise plants. The same may be true for families with children, who were found to be more price sensitive than other consumer groups. The result that consumers are willing to pay premiums for plants labeled with the *Yellow Tag* is a clear indicator of preference for these plants, as these plants are not necessarily more expensive in production.

6.5 Opportunities for Educational Programs

We find differences among generations regarding environmental attitudes, drought awareness and environmental responsibility. Millennials appear to exhibit a lower awareness of drought and how landscape gardening and the choice of ornamental

plants may affect water resources. Older generations, on the other hand, are less aware of the dangers of climate change and greenhouse gas emissions, in general. Previous studies have shown a positive effect of information treatments on drought awareness and interest in DT plants and water-conserving production methods (Fan et al., 2017; Knuth et al., 2018; Krovetz, 2016). Since drought and water shortage are real and omnipresent threats to Utah's environment and residents, educational programs can me a valuable tool to help advance the water conservation effort.

6.6 Limitations and Future Research

The scope of this survey was limited to one type of ornamental plant, perennial flowers. Previous studies, conducted in other regions of the US, indicate that consumers' WTP may change with respect to plant type (Khachatryan, Campbell, et al., 2014; Khachatryan, Yue, et al., 2014; Klingeman et al., 2004). We therefore suggest including different types of plants, such as annuals, shrubs, edibles or trees, into future research on consumers' WTP for drought tolerant plants. Additionally, our sample size was limited, making it hard to extrapolate to the whole Utah population. Future surveys with a larger scope may help gather more accurate data. Other limitations exist regarding the methodology used. We used Multinomial Logit Models to estimate consumer utility and WTP for plant attributes, which generally give robust results (Train, 1999). Today, there are more advanced models available, such as Mixed Logit Models or Latent Class Models, which can account for preference heterogeneity and individuals' preferences

when estimating utility and WTP. We therefore propose to invest more research into the gathered data, to see whether the coefficients estimated hold true.

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APPENDICES

Appendix A - Survey

https://usu.co1.qualtrics.com/jfe/form/SV_a4xpoRRANielpgp

Appendix B – Results Preference & Behavior

Table 18. Stated level of expertise in gardening

	Median			**Mean**	
Whole Sample	**2.0**			**2.4**	
	Level of Expertise				
	Novice	**Some experience**	**Competent**	**Proficient**	**Expert**
Whole Sample	18.8%	33.3%	33.5%	14.0%	0.4%
Baby Boomers	15.7%	28.1%	41.3%	14.9%	0.0%
Generation X	17.2%	34.9%	30.2% *	16.6%	1.2%
Millennials	22.5%	35.3%	31.2% .	11.0%	0.0%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). standard deviation in parenthesis.

Table 19. Purchasing frequency of ornamental plants and landscaping materials

	Frequency				
	Once every 3 months	**Twice a year**	**Once a year**	**Every two years**	**Never**
Whole Sample					
Annual flowers, vegetables and/or seeds	12.3%	29.6%	49.7%	4.3%	4.1%
Ornamental trees and shrubs	4.3%	8.6%	31.1%	36.5%	19.4%
Perennial flowers and ornamental grasses	9.7%	22.5%	49.0%	13.0%	5.8%
Fertilizer, pesticide or soil amendments	19.7%	32.4%	37.8%	6.3%	3.9%
Gardening/landscaping tools	8.2%	21.2%	37.8%	29.2%	3.7%
Baby Boomers					
Annual flowers, vegetables and/or seeds	2.5% ***	29.8%	57.9%	2.5%	2.5%
Ornamental trees and shrubs	2.5%	10.7%	24.8%	38.0%	24.0%
Perennial flowers and ornamental grasses	11.6%	18.2%	47.1%	17.4%	5.8%
Fertilizer, pesticide or soil amendments	14.0%	32.2%	47.1% *	5.8%	0.8%
Gardening/landscaping tools	5.8%	15.7%	33.9%	38.8% *	5.8%
Generation X					
Annual flowers, vegetables and/or seeds	13.6%	29.0%	52.1%	3.6%	1.8%
Ornamental trees and shrubs	3.6%	5.9%	36.1%	40.2%	14.2%
Perennial flowers and ornamental grasses	10.1%	24.3%	47.3%	14.2%	4.1%
Fertilizer, pesticide or soil amendments	23.7%	35.5%	31.4%	6.5%	3.0%
Gardening/landscaping tools	7.1%	22.5%	45.0% *	24.3%	1.2%
Millennials					
Annual flowers, vegetables and/or seeds	14.5%	30.1%	41.6% *	6.4%	7.5%
Ornamental trees and shrubs	6.4%	9.8%	30.6%	31.8%	21.4%
Perennial flowers and ornamental grasses	8.1%	23.7%	52.0%	8.7%	7.5%
Fertilizer, pesticide or soil amendments	19.7%	29.5%	37.6%	6.4%	6.9%
Gardening/landscaping tools	11.0%	23.7%	33.5%	27.2%	4.6%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parenthesis.

Table 20. Stated importance of characteristics of retailers of ornamental plants

	Importance				
Whole Sample	**Not at all**	**Slightly**	**Moderately**	**Very**	**Extremely**
Familiarity with Manager	37.4%	26.3%	22.3%	9.9%	4.1%
Location	2.2%	8.6%	32.2%	41.5%	15.6%
Owned by Locals	16.2%	27.2%	32.8%	19.4%	4.3%
Price	0.2%	5.4%	24.2%	42.3%	27.9%
Quality	0.0%	1.3%	9.1%	46.9%	42.8%
Seasonal Appropriateness of Products	1.3%	6.3%	23.8%	45.1%	23.5%
Store Philosophy/Value	16.6%	125.3%	36.5%	16.9%	4.8%
Variety	0.2%	4.3%	24.2%	48.6%	22.7%
Baby Boomers					
Familiarity with Manager	35.5%	28.9%	21.5%	9.9%	4.1%
Location	3.3%	5.8%	30.6%	40.5%	19.8%
Owned by Locals	16.5%	22.3%	32.2%	23.1%	5.8%
Price	0.0%	4.1%	26.4%	40.5%	28.9%
Quality	0.0%	0.8%	5.0%	45.5%	48.8%
Seasonal Appropriateness of Products	0.8%	4.1%	14.0%*	52.1%	28.9%
Store Philosophy/Value	16.5%	24.8%	35.5%	19.0%	4.1%
Variety	0.0%	5.0%	22.3%	49.6%	23.1%
Generation X					
Familiarity with Manager	36.7%	27.2%	21.9%	11.2%	3.0%
Location	1.8%	8.9%	33.7%	40.8%	14.8%
Owned by Locals	14.2%	26.0%	34.9%	20.1%	4.7%
Price	0.0%	5.9%	21.3%	46.2%	26.6%
Quality	0.0%	1.2%	10.7%	47.3%	40.8%
Seasonal Appropriateness of Products	1.2%	4.1%	24.3%	44.4%	26.0%
Store Philosophy/Value	17.8%	23.1%	39.1%	14.8%	5.3%
Variety	0.0%	3.0%	22.5%	47.9%	26.6%
Millennials					
Familiarity with Manager	39.3%	23.7%	23.1%	8.7%	5.2%
Location	1.7%	10.4%	31.8%	42.8%	13.3%
Owned by Locals	17.9%	31.8%	31.2%	16.2%	2.9%
Price	0.6%	5.8%	25.4%	39.9%	28.3%
Quality	0.0%	1.7%	10.4%	47.4%	40.5%
Seasonal Appropriateness of Products	1.7%	9.8%	30.1%	41.0%	17.3%
Store Philosophy/Value	15.6%	27.7%	34.7%	17.3%	4.6%
Variety	0.6%	5.2%	27.2%	48.6%	18.5%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parenthesis.

Table 21. Stated importance of different plant characteristics

	Importance				
Whole Sample					
Characteristic	**Not at all**	**Slightly**	**Moderately**	**Very**	**Extremely**
Appearance	0.6%	3.1%	10.5%	51.0%	35.4%
Climate adaption	2.2%	6.0%	25.5%	47.7%	19.0%
Drought tolerance	5.2%	17.7%	34.6%	32.4%	10.2%
Grown in Utah	13.8%	24.8%	38.9%	16.6%	5.8%
Grown locally	16.2%	24.6%	38.0%	18.4%	28.0%
Maintenance	0.4%	5.0%	23.5%	48.8%	22.2%
Price	6.5%	7.5%	31.5%	39.7%	20.5%
Resistance to disease	3.2%	10.8%	28.5%	36.3%	14.7%
Seasonality	4.1%	9.9%	25.3%	48.4%	12.3%
Size	3.2%	10.5%	40.6%	35.2%	10.4%
Baby Boomers					
Appearance	0.8%	1.6%	5.0%	56.2%	36.4%
Climate adaption	1.7%	3.3%	20.7%	45.5%	28.9%
Drought tolerance	1.6%	18.2%	37.2%	28.9%	14.1%
Grown in Utah	9.1%	27.3%	34.7%	22.3%	6.6%
Grown locally	19.8%	24.0%	33.1%	19.8%	3.3%
Maintenance	0.0%	3.3%	25.6%	47.9%	23.1%
Price	0.8%	5.8%	33.9%	37.2%	22.3%
Resistance to disease	1.6%	9.1%	23.1%	48.8%	17.3%
Seasonality	4.9%	4.1%	26.5%	50.4%	14.1%
Size	2.5%	8.3%	38.8%	37.2%	13.2%
Generation X					
Appearance	0.0%	1.8%	11.8%	52.7%	33.7%
Climate adaption	1.8%	4.1%	21.9%	50.9%	21.3%
Drought tolerance	4.1%	16.0%	32.0%	40.8%	7.1%
Grown in Utah	13.0%	19.5%	45.6%	15.4%	6.5%
Grown locally	12.4%	26.0%	41.4%	17.8%	2.4%
Maintenance	0.0%	1.8%	21.3%	56.8%	20.1%
Price	0.0%	10.7%	32.4%	37.9%	20.1%
Resistance to disease	3.0%	9.5%	28.4%	41.4%	17.8%
Seasonality	3.6%	8.3%	22.5%	55.0%	10.7%
Size	0.6%	10.7%	40.2%	38.5%	10.1%
Millennials					
Appearance	1.2%	4.6%	12.1%	45.7%	36.4%
Climate adaption	2.9%	9.8%	31.2%	46.2%	9.8%
Drought tolerance	8.7%	19.1%	35.3%	26.6%	10.4%
Grown in Utah	17.9%	28.3%	35.3%	13.9%	4.6%
Grown locally	17.3%	23.7%	38.2%	17.9%	2.9%
Maintenance	1.2%	9.3%	24.3%	41.6%	23.7%
Price	1.2%	5.8%	30.1%	43.3%	19.7%
Resistance to disease	4.6%	13.3%	32.4%	39.9%	9.8%
Seasonality	4.1%	15.6%	27.2%	40.5%	12.7%
Size	6.4%	12.1%	41.2%	30.6%	8.7%

Table 22. Purchasing behavior towards specially labeled ornamental plants

	Have you purchased these plant types before?	
Whole sample	**Yes**	**No**
Locally produced	91.1%	8.9%
Drought tolerant	71.7%	28.3%
Native	73.2%	26.8%
Exotic	33.9%	66.1%
Baby Boomers		
Locally produced	93.4%	6.6%
Drought tolerant	76.0%	24%
Native	75.2%	24.8%
Exotic	19.0%	81.0%
Generation X		
Locally produced	93.5%	6.5%
Drought tolerant	72.8%	27.2%
Native	76.3%	23.7%
Exotic	35.5% **	64.5% **
Millennials		
Locally produced	87.3% .	12.7% .
Drought tolerant	67.6%	32.4%
Native	68.8%	31.2%
Exotic	42.8% ***	57.1% ***

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). standard deviation in parenthesis.

Table 23. Frequency of climate friendly activities

	Frequency			
Whole Sample	**Always**	**Frequently**	**Sometimes**	**Never**
Riding the bicycle/using public transport	2.6%	9.7%	27.5%	60.3%
Buying carbon offset certificates	1.7%	3.2%	8.9%	86.2%
Donating to environmental organizations	2.6%	8.0%	38.2%	51.2%
Using electricity from renewable sources	6.9%	9.3%	17.9%	65.9%
Recycling	47.1%	28.3%	19.2%	5.4%
Using alternative fuel vehicles	4.3%	3.7%	9.1%	82.9%
Voting or campaigning on environmental issues	16.6%	17.1%	36.9%	29.4%
Baby Boomers				
Riding the bicycle/using public transport	1.7%	2.5% ***	19.0% *	76.9%***
Buying carbon offset certificates	1.7%	2.5%	4.1% *	91.7%
Donating to environmental organizations	0.0%	5.0%	39.7%	55.4%
Using electricity from renewable sources	6.6%	2.5% **	19.8%	71.1%
Recycling	45.5%	27.3%	23.1%	4.1%
Using alternative fuel vehicles	7.4%	2.5%	6.6%	83.5%
Voting or campaigning on environmental issues	19.8%	15.7%	39.7%	24.8%
Generation X				
Riding the bicycle/using public transport	0.0% *	8.9%	23.7%	67.5% *
Buying carbon offset certificates	1.8%	3.0%	8.9%	86.4%
Donating to environmental organizations	3.6%	7.7%	36.1%	52.7%
Using electricity from renewable sources	6.5%	10.1%	15.4%	68.1%
Recycling	45.6%	28.4%	19.5%	65.1%
Using alternative fuel vehicles	3.6%	2.4%	7.1%	87.0%
Voting or campaigning on environmental issues	17.8%	18.9%	36.1%	27.2%
Millennials				
Riding the bicycle/using public transport	5.8% **	15.6% **	37.0% **	41.6%***
Buying carbon offset certificates	1.7%	4.1%	12.1%	82.1%
Donating to environmental organizations	3.5%	10.4%	39.3%	46.8%
Using electricity from renewable sources	7.5%	13.3%	19.1%	60.1%
Recycling	49.7%	28.9%	16.2%	5.2%
Using alternative fuel vehicles	2.9%	5.8%	12.7%	78.6%
Voting or campaigning on environmental issues	13.3%	16.2%	35.8%	34.7%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parenthesis.

Table 24. Perceived regionality of ornamental plant production

	Regionality		
Whole Sample	**Local**	**Regional**	**Neither**
50 miles	89.4%	9.5%	1.1%
100 miles	41.7%	54.4%	3.9%
250 miles	11.2%	65.7%	23.1%
500 miles	3.9%	45.8%	50.3%
County	60.5%	18.4%	21.2%
State	26.1%	62.4%	11.5%
Neighboring State	3.0%	56.4%	40.6%
Contiguous USA	0.7%	19.0%	80.4%
Baby Boomers			
50 miles	86.0%	12.4%	1.7%
100 miles	28.9% ***	63.6% *	7.4%
250 miles	7.4%	58.7%	33.9% **
500 miles	1.7%	31.4% ***	66.9% ***
County	62.0%	16.5%	21.5%
State	17.4% **	66.9%	15.7%
Neighboring State	0.8%	48.8%	50.4% **
Contiguous USA	1.7%	9.9% **	88.4% **
Generation X			
50 miles	91.1%	7.7%	1.2%
100 miles	46.2%	50.9%	3.0%
250 miles	11.8%	69.8%	18.3%
500 miles	4.1%	47.3%	48.5%
County	63.9%	13.6%	22.5%
State	29.6%	63.3%	7.1%
Neighboring State	3.0%	62.7%	34.3%
Contiguous USA	0.0%	20.7%	79.3%
Millennials			
50 miles	90.2%	9.3%	0.6%
100 miles	46.2%	51.5%	2.3%
250 miles	13.3%	66.5%	20.2%
500 miles	5.2%	56.3% **	40.5% **
County	56.1%	24.3%	19.7%
State	28.9%	58.4%	12.7%
Neighboring State	4.6%	55.5%	39.9%
Contiguous USA	0.6%	23.7%	75.7%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). standard deviation in parenthesis.

Table 25. Positions on water use issues

	Level of Agreement						
	Str. Agree	**Agree**	**Somewhat agree**	**Neither agree nor disagree**	**Somewhat disagree**	**Disagree**	**Str. disagree**
Whole Sample							
WtrAct	7.3%	23.8%	33.7%	19.4%	8.6%	5.4%	1.7%
WtrDrt	1.7%	4.5%	9.5%	17.7%	24.8%	29.8%	11.9%
WtrDT	22.2%	38.7%	28.5%	8.0%	1.5%	0.7%	0.4%
WtrInd	19.7%	40.2%	26.6%	10.4%	1.9%	1.3%	0.0%
WtrMtn	3.5%	12.7%	30.5%	35.4%	11.5%	5.0%	1.5%
WtrPrc	26.4%	35.9%	19.2%	9.7%	5.4%	3.0%	0.4%
Baby Boomers							
WtrAct	5.0%	24.0%	36.4%	19.0%	8.3%	5.8%	1.7%
WtrDrt	0.8%	1.7%	8.3%	11.6%	25.6%	36.4%	15.7%
WtrDT	28.9%	47.9%*	18.2%**	4.1%	0.8%	0.0%	0.0%
WtrInd	23.1%	49.6%*	21.5%	4.1%	0.8%	0.8%	0.0%
WtrMtn	5.0%	8.3%	24.0% *	44.6% *	9.1%	9.1%	0.0%
WtrPrc	24.0%	43.8%	18.2%	9.1%	1.7%	2.5%	0.8%
Generation X							
WtrAct	9.5%	20.1%	31.4%	21.9%	7.7%	7.1%	2.4%
WtrDrt	1.8%	5.3%	8.3%	19.5%	26.0%	26.6%	12.4%
WtrDT	25.5%	34.9%	29.0%	7.7%	1.2%	1.2%	0.6%
WtrInd	23.7%	36.1%	26.6%	10.1%	2.4%	1.2%	0.0%
WtrMtn	3.0%	14.8%	30.8%	30.2%	15.4%	3.0%	3.0%
WtrPrc	30.8%	34.9%	17.8%	9.5%	4.7%	2.4%	0.0%
Millennials							
WtrAct	6.9%	27.2%	34.1%	17.3%	9.8%	3.5%	1.2%
WtrDrt	2.3%	5.8%	11.6%	20.2%	23.1%	28.3%	8.7%
WtrDT	14.5%**	35.8%	35.3%**	11.0%	2.3%	0.6%	0.6%
WtrInd	13.3% *	37.6%	30.1%	15.0%	2.3%	1.7%	0.0%
WtrMtn	2.9%	13.9%	34.7%	34.1%	9.3%	4.1%	1.2%
WtrPrc	23.7%	31.2%	21.4%	10.4%	8.7%	4.1%	0.6%

WtrAct: My actions to conserve water at home will help protect water resources.
WtrDrt: Water shortages and drought are a concern where I live.
WtrDT: Purchasing "drought tolerant" labeled plants will help protect water resources.
WtrInd: It is too hard for an individual to protect our water resources.
WtrMtn: The maintenance of ornamental plants requires significant amounts of water.
WtrPrc: I am willing to pay higher prices for drought tolerant ornamental plants to protect water resources.

Note: Scale used is 1="Strongly disagree", 2="Disagree", 3="Somewhat disagree", 4="Neither agree nor disagree", 5=" Agree somewhat Agree", 6="Agree", 7="Strongly agree".
Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parentheses.

Table 26. Stated level of damage on the environment of certain activities

	Level of Damage			
	No Damage	**Slight Damage**	**Moderate Damage**	**Much Damage**
Whole Sample				
Climate Change	13.0%	26.1%	32.2%	28.7%
Fertilizer Use in Landscaping	19.0%	44.5%	28.9%	7.6%
Greenhouse Gas Emissions	10.8%	31.1%	29.4%	28.7%
Not Recycling	2.2%	19.2%	36.7%	41.9%
Water Use in Landscaping	16.6%	42.5%	31.3%	9.5%
Baby Boomers				
Climate Change	17.4%	28.1%	33.1%	21.5%
Fertilizer Use in Landscaping	16.5%	42.1%	37.2%	4.1%
Greenhouse Gas Emissions	9.9%	38.0%	33.9%	18.2%
Not Recycling	0.0%	23.1%	37.2%	39.7%
Water Use in Landscaping	14.9%	39.7%	32.2%	13.2%
Generation X				
Climate Change	17.2%	24.9%	32.0%	26.0%
Fertilizer Use in Landscaping	19.5%	43.2%	24.3%	13.0%
Greenhouse Gas Emissions	14.2%	29.6%	27.2%	29.0%
Not Recycling	4.1%	19.5%	38.5%	37.9%
Water Use in Landscaping	17.2%	43.8%	29.6%	9.5%
Millennials				
Climate Change	5.8%	26.0%	31.8%	36.4%
Fertilizer Use in Landscaping	20.2%	47.4%	27.7%	4.6%
Greenhouse Gas Emissions	8.1%	27.7%	28.3%	35.8%
Not Recycling	1.7%	16.2%	34.7%	47.4%
Water Use in Landscaping	17.3%	43.4%	32.4%	6.9%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). standard deviation in parenthesis.

Table 27. Concern about the price of water

	Level of Concern				
	Extremely Concerned	**Moderately Concerned**	**Somewhat Concerned**	**Slightly Concerned**	**Not at all Concerned**
Whole sample					
In general	15.6%	25.9%	30.9%	16.4%	8.2%
When making landscaping decisions	17.3%	32.8%	26.8%	17.5%	5.6%
Baby Boomers					
In general	24.0%	37.2%	25.6%	9.1%	4.1%
When making landscaping decisions	19.8%	43.8%	24.8%	9.9%	1.7%
Generation X					
In general	14.2%	26.6%	34.3%	17.2%	7.7%
When making landscaping decisions	14.8%	31.4%	28.4%	18.9%	6.5%
Millennials					
In general	13.9%	26.0%	33.5%	16.8%	7.5%
When making landscaping decisions	17.9%	26.6%	26.6%	21.4%	7.5%

Statistical significance was computed via difference in means test with confidence level of 0.01 (***), 0.05 (**) and 0.1 (*). Standard deviation in parenthesis.

Appendix C – Results Choice Experiments – Multinomial logit models

Table 28. WTP estimates for orange daylilies over yellow daylilies

Gender	**Male**	**Female**				
	-0.06	-0.09				
	(0.52)	(0.3)				
Age	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**
	-1.29 *	0.51	-0.05	0.26	0.65	0.39
	(0.66)	(0.64)	(0.52)	(0.59)	(0.58)	(0.49)
Gens	**Millennial**	**Generation X**	**Baby Boomers**			
	-0.78	0.08	0.53			
	(0.48)	(0.4)	(0.39)			
Edu	**No High School**	**High School Diploma**	**Some College**	**Associates Degree**	**Bachelor's Degree**	**Master's Degree**
	-1.08	-0.22	0	0.21	-0.5	0.6
	(2.21)	(0.57)	(0.47)	(0.78)	(0.43)	(0.64)
Income	**<$20,000**	**$20,000-$39,999**	**$40,000-$59,999**	**$60,000-$79,999**	**$80,000-$99,999**	**≥100,000**
	-0.7	-0.01	-0.01	0.12	0.36	-1.01
	(0.82)	(0.49)	(0.5)	(0.52)	(0.58)	(0.89)
Marital State	**Single**	**Married**	**Other**			
	-0.76	-0.03	1.8			
	(0.47)	(0.32)	(0.84)			
Children	**No**	**Yes**				
	-0.08	0.04				
	(0.4)	(0.43)				
Housing Type	**Single House**	**Attached House**	**Apartment**	**Other**		
	0.18	-0.74	-0.98 .	-0.84		
	(0.3)	(1.38)	(0.56)	(1.34)		
Level of Expertise	**Novice**	**Some Experience**	**Competent**	**Proficient**	**Expert**	
	-0.06	-0.42	0.23	0.13	-8.99	
	(0.51)	(0.41)	(0.44)	(0.73)	(13.17)	
Water Price	**Not at all concerned**	**Slightly Concerned**	**Somewhat concerned**	**Moderately concerned**	**Extremely concerned**	
General	-0.94	-0.16	-0.06	-0.26	0.9	
	(0.75)	(0.57)	(0.44)	(0.45)	(0.64)	
Landscaping	-1.65 .	-0.36	-0.57	0.36	0.37	
	(0.87)	(0.46)	(0.6)	(0.41)	(0.58)	
Water Issues	**Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
WtrDT	-0.19	-0.67	-1.58	-0.38	-0.34	2.6 ***
	(1.55)	(1.23)	(0.62)	(0.45)	(0.4)	(0.6)
WtrDrt	-1.86 .	-0.23	-1.70	0.03	0.21	0.36
	(1.08)	(1.04)	(0.71)	(0.53)	(0.42)	(0.50)
WtrPrc	-1.28 *	-1.10	-0.34	0.02	0.20	2.64 *
	(0.60)	(0.74)	(0.50)	(0.45)	(0.52)	(1.03)

Note: Significance levels given at 0.001 (***), 0.01 (**), 0.05 (*) and 0.1(.). Standard error in parentheses.

Table 29. WTP estimates for purple spiderwort over pink spiderwort

Gender	**Male**	**Female**				
	-0.21	0.24				
	(0.72)	(0.41)				
Age	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**
	0.8	1.27	0.1	-0.05	-2.2 *	-1.15
	(0.73)	(0.73)	(0.66)	(0.79)	(1.04)	(0.84)
Gens	**Millennial**	**Generation X**	**Baby Boomers**			
	1.05	0.03	-1.61 *			
	(0.56)	(0.54)	(0.68)			
Edu	**No High School**	**High School Diploma**	**Some College**	**Associates Degree**	**Bachelor's Degree**	**Master's Degree**
	-3.59	1.19 .	0.13	0.79	-0.04	-2.07 .
	(3.51)	(0.69)	(0.62)	(0.93)	(0.56)	(1.14)
Income	**<$20,000**	**$20,000-$39,999**	**$40,000-$59,999**	**$60,000-$79,999**	**$80,000-$99,999**	**≥100,000**
	-0.85	0.7	0.34	0.58	-1.12	-0.7
	(1.2)	(0.62)	(0.64)	(0.64)	(0.94)	(1.09)
Marital State	**Single**	**Married**	**Other**			
	-0.44	0.29	0.96			
	(0.63)	(0.42)	(1.12)			
Children	**No**	**Yes**				
	-0.42	-0.41				
	(0.61)	(0.96)				
Housing Type	**Single House**	**Attached House**	**Apartment**	**Other**		
	-0.08	-1.13	-1.23 .	-1.11		
	(0.42)	(1.56)	(0.72)	(1.44)		
Level of Expertise	**Novice**	**Some Experience**	**Competent**	**Proficient**	**Expert**	
	0.41	0.27	-0.38	0.95	-80.22	
	(0.66)	(0.53)	(0.6)	(0.9)	(16428)	
Water Price	**Not at all concerned**	**Slightly Concerned**	**Somewhat concerned**	**Moderately concerned**	**Extremely concerned**	
General	-0.99	0.41	-0.42	0.95 .	-0.06	
	(1.07)	(0.7)	(0.6)	(0.57)	(0.88)	
Landscaping	0.47	0.85	-0.39	0.26	-0.96	
	(1.03)	(0.550	(0.78)	(0.55)	(0.85)	
Water Issues	**Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
WtrDT	4.5 *	1.67	-0.05	-0.01	0.16	-0.72
	(1.89)	(1.32)	(0.74)	(0.58)	(0.53)	(0.84)
WtrDrt	2.81 **	1.34	-0.94	0.33	-0.03	-0.30
	(1.07)	(1.23)	(0.98)	(0.66)	(0.56)	(0.68)
WtrPrc	0.72	0.38	-0.40	0.39	-0.10	-0.16
	(0.71)	(0.87)	(0.65)	(0.59)	(0.68)	(1.38)

Note: Significance levels given at 0.001 (***), 0.01 (**), 0.05 (*) and 0.1(.). Standard error in parentheses.

Table 30. WTP estimates of plants labeled Grown in Utah over plants without production location claim

Gender	**Male**	**Female**				
	0.47	0.3				
	(0.63)	(0.28)				
Age	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**
	-0.53	0.12	0.35	0.41	0.94	0.14
	(0.66)	(0.6)	(0.53)	(0.63)	(0.64)	(0.57)
Gen	**Millennial**	**Generation X**	**Baby Boomers**			
	-0.12	0.39	0.49			
	(0.45)	(0.41)	(0.43)			
Edu	**No High School**	**High School Diploma**	**Some College**	**Associates Degree**	**Bachelor's Degree**	**Master's Degree**
	-2.44	0.41	0.28	1.5 *	-0.31	0.19
	(2.72)	(0.59)	(0.48)	(0.76)	(0.44)	(0.73)
Income	**<$20,000**	**$20,000-$39,999**	**$40,000-$59,999**	**$60,000-$79,999**	**$80,000-$99,999**	**≥100,000**
	-0.86	0.3	-0.02	0.81	0.36	0.01
	(0.91)	(0.51)	(0.52)	(0.53)	(0.64)	(0.87)
Marital State	**Single**	**Married**	**Other**			
	-0.19	0.26	0.43			
	(0.49)	(0.31)	(0.9)			
Children	**No**	**Yes**				
	0.04	0.19				
	(0.44)	(0.83)				
Housing Type	**Single House**	**Attached House**	**Apartment**	**Other**		
	0.23	-0.66	-0.93	-0.79		
	(0.29)	(1.47)	(0.65)	(1.39)		
Level of Expertise	**Novice**	**Some Experience**	**Competent**	**Proficient**	**Expert**	
	0.15	0.24	0.17	0.21	-0.5	
	(0.53)	(0.41)	(0.46)	(0.75)	(7.18)	
Water Price	**Not at all concerned**	**Slightly Concerned**	**Somewhat concerned**	**Moderately concerned**	**Extremely concerned**	
General	0.48	0.5	-0.11	0.17	0.34	
	(0.77)	(0.58)	(0.46)	(0.45)	(0.69)	
Landscaping	0.06	0.29	-0.6	0.58	0.37	
	(0.84)	(0.47)	(0.63)	(0.42)	(0.63)	
Water Issues	**Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
WtrDT	-3.1	-0.62	0.12	0.1	0.05	1.47 *
	(1.89)	(1.36)	(0.62)	(0.45)	(0.4)	(0.64)
WtrDrt	-0.03	-0.37	0.12	0.92 .	0.14	-0.15
	(0.95)	(1.08)	(0.73)	(0.54)	(0.43)	(0.53)
WtrPrc	-0.92	0.10	-0.13	0.21	0.83	1.08
	(0.65)	(0.75)	(0.52)	(0.46)	(0.53)	(1.11)

Note: Significance levels given at 0.001 (***), 0.01 (**), 0.05 (*) and 0.1(.). Standard error in parentheses.

Table 31. WTP estimates for plants labeled Grown in the Western US over plants without claim

Gender	**Male**	**Female**				
	-0.33	-0.17				
	(0.59)	(0.31)				
Age	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**
	0.5	-0.95	0.07	-0.51	0.28	-0.72
	(0.67)	(0.66)	(0.59)	(0.69)	(0.66)	(0.6)
Gen	**Millennial**	**Generation X**	**Baby Boomers**			
	-0.35	-0.16	-0.28			
	(0.48)	(0.45)	(0.45)			
Edu	**No High School**	**High School**	**Some College**	**Associates Degree**	**Bachelor's Degree**	**Master's Degree**
	-4.95	-0.38	-0.27	0.41	-0.06	-0.71
	(3.29)	(0.67)	(0.52)	(0.85)	(0.46)	(0.76)
Income	**<$20,000**	**$20,000-$39,999**	**$40,000-$59,999**	**$60,000-$79,999**	**$80,000-$99,999**	**≥100,000**
	-0.37	-0.39	0.05	0.21	-0.9	-0.22
	(0.92)	(0.56)	(0.55)	(0.58)	(0.68)	(0.91)
Marital State	**Single**	**Married**	**Other**			
	-0.55	-0.02	-0.95			
	(0.52)	(0.34)	(0.98)			
Children	**No**	**Yes**				
	-0.38	-0.36				
	(0.47)	(0.85)				
Housing Type	**Single House**	**Attached House**	**Apartment**	**Other**		
	-0.23	-0.36	-1.37 *	-1.26		
	(0.32)	(1.54)	(0.67)	(1.42)		
Level of Experience	**Novice**	**Some Experience**	**Competent**	**Proficient**	**Expert**	
	-0.38	0.35	-0.58	-0.42	-3.82	
	(0.58)	(0.45)	(0.49)	(0.81)	(8.31)	
Water Price	**Not at all concerned**	**Slightly Concerned**	**Somewhat concerned**	**Moderately concerned**	**Extremely concerned**	
General	-0.24	0.33	0.08	-0.17	-1.7 *	
	(0.85)	(0.63)	(0.49)	(0.49)	(0.78)	
Landscaping	-0.19	0.24	-0.83	0.09	-0.74	
	(0.95)	(0.51)	(0.67)	(0.45)	(0.67)	
Water Issues	**Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
WtrDT	0.86	0.88	0.41	-0.66	-0.15	-0.26
	(1.59)	(1.4)	(0.67)	(0.5)	(0.43)	(0.67)
WtrDrt	0.36	-1.00	-0.56	0.01	-0.28	-0.19
	(1.02)	(1.16)	(0.80)	(0.60)	(0.46)	(0.56)
WtrPrc	0.04	-0.13	-0.42	0.00	-0.43	-0.06
	(0.69)	(0.84)	(0.56)	(0.50)	(0.57)	(1.16)

Note: Significance levels given at 0.001 (***), 0.01 (**), 0.05 (*) and 0.1(.). Standard error in parentheses.